

บทที่ 3

การวิเคราะห์ข้อมูล

จากการศึกษาเทคนิคการวิเคราะห์อนุกรมเวลาแบบคลาสสิก เทคนิคการทำให้เรียบแบบการเฉลี่ยเคลื่อนที่ และเทคนิคการทำให้เรียบแบบเอ็กซ์โพเนนเชียล โดยข้อมูลที่น่าสนใจคือ ข้อมูลปริมาณน้ำฝนรายเดือนของจังหวัดตาก ซึ่งเก็บรวบรวมมาจากกรมอุตุนิยมวิทยา ตั้งแต่เดือนมกราคม 2514 ถึงเดือนธันวาคม 2544 รวมเวลาทั้งหมด 372 เดือน ข้อมูลมีหน่วยเป็น มิลลิเมตร โดยการวิเคราะห์ข้อมูลแบ่งเป็น 2 รูปแบบคือ รูปแบบคงที่ และ รูปแบบเชิงเส้น

3.1 รูปแบบคงที่

3.1.1 วิธีเฉลี่ยเคลื่อนที่แบบธรรมดา (Simple Moving Average)

3.1.2 วิธีการทำให้เรียบแบบเอ็กซ์โพเนนเชียล (Single Exponential Smoothing)

3.2 รูปแบบเชิงเส้น

3.2.1 วิธีกำลังสองน้อยที่สุด (Least Square Method)

3.2.2 วิธีเฉลี่ยเคลื่อนที่สองชั้น (Double Moving Average)

3.2.3 วิธีการทำให้เรียบแบบเอ็กซ์โพเนนเชียลสองชั้น (Double Exponential Smoothing)

ในการวิเคราะห์ข้อมูลจะทำการเปรียบเทียบส่วนเบี่ยงเบนสัมบูรณ์เฉลี่ยของแต่ละวิธี โดยที่วิธีการพยากรณ์ที่ทำให้ส่วนเบี่ยงเบนสัมบูรณ์เฉลี่ย มีค่าน้อยจะพยากรณ์ได้ดีกว่าวิธีที่มีค่ามาก

3.1 รูปแบบคงที่

3.1.1 วิธีเฉลี่ยเคลื่อนที่แบบธรรมดา (Simple Moving Average)

1) ค่าแนวโน้ม (T) จากที่กล่าวไว้ในบทที่ 2 (2.2.1.1) โดยการวิเคราะห์จะทำการเฉลี่ยเคลื่อนที่ตั้งแต่ครั้งละ 2 ถึง 12 เดือน พบว่าการเฉลี่ยเคลื่อนที่ครั้งละ 12 เดือนทำให้ได้ค่าคลาดเคลื่อนกำลังสองเฉลี่ยน้อยที่สุด การคำนวณหาค่าแนวโน้มแสดงดังตาราง 3.1

ตาราง 3.1 แสดงการหาค่าแนวโน้มโดยการเฉลี่ยเคลื่อนที่แบบธรรมดาครั้งละ 12 เดือน

เดือน	ข้อมูล Y	ค่าเฉลี่ยเคลื่อนที่ 12 เดือน (M_t)	ค่าแนวโน้ม T	Y/T = SCI
1	0	*	*	*
2	0	*	*	*
3	13.7	*	*	*
4	14.1	*	*	*
5	222.7	*	*	*
6	55.6	*	*	*
7	101.4	*	*	*
8	194.9	*	*	*
9	182.1	*	*	*
10	210.6	*	*	*
11	20.4	*	*	*
12	18.2	86.142	*	*
13	0.7	86.200	86.142	0.813
14	3.1	86.458	86.200	3.596
15	7.3	85.925	86.458	8.443
16	74.7	90.975	85.925	86.936
17	112.3	81.775	90.975	123.441
18	73.9	83.300	81.775	90.370
19	68.8	80.583	83.300	82.593
20	47.4	68.292	80.583	58.821
21	380.5	84.825	68.292	557.169
22	208.9	84.683	84.825	246.272
23	107.4	91.933	84.683	126.825
24	29.8	92.900	91.933	32.415
25	0	92.842	92.900	0.000
26	0	92.583	92.842	0.000
27	123.6	102.275	92.583	133.501
28	0	96.050	102.275	0.000
29	336.4	114.725	96.050	350.234
30	140.3	120.258	114.725	122.292
31	38.7	117.750	120.258	32.181
32	119.1	123.725	117.750	101.146
33	347.9	121.008	123.725	281.188
34	243	123.850	121.008	200.813

ตาราง 3.1 (ต่อ)

เดือน	ข้อมูล Y	ค่าเฉลี่ยเคลื่อนที่ 12 เดือน (M_t)	ค่าแนวโน้ม T	Y/T = SCI
35	7.6	115.533	123.850	6.136
36	0	113.050	115.533	0.000
37	0	113.050	113.050	0.000
38	0	113.050	113.050	0.000
39	64.3	108.108	113.050	56.877
40	123.3	118.383	108.108	114.052
41	267.8	112.667	118.383	226.214
42	50.6	105.192	112.667	44.911
43	90.9	109.542	105.192	86.414
44	131	110.533	109.542	119.589
45	267.7	103.850	110.533	242.189
46	299.1	108.525	103.850	288.012
47	170.2	122.075	108.525	156.830
48	3.9	122.400	122.075	3.195
49	76.6	128.783	122.400	62.582
50	0	128.783	128.783	0.000
51	0	123.425	128.783	0.000
52	3.3	113.425	123.425	2.674
53	199.3	107.717	113.425	175.711
54	107.1	112.425	107.717	99.428
55	64.4	110.217	112.425	57.283
56	87.8	106.617	110.217	79.661
57	192.4	100.342	106.617	180.460
58	276.8	98.483	100.342	275.857
59	85.1	91.392	98.483	86.411
60	33.7	93.875	91.392	36.874
61	0	87.492	93.875	0.000
62	0.3	87.517	87.492	0.343
63	4.3	87.875	87.517	4.913
64	20.9	89.342	87.875	23.784
65	166.1	86.575	89.342	185.915
66	85.4	84.767	86.575	98.643

ตาราง 3.1 (ต่อ)

เดือน	ข้อมูล Y	ค่าเฉลี่ยเคลื่อนที่ 12 เดือน (M_t)	ค่าแนวโน้ม T	Y/T = SCI
67	132.4	90.433	84.767	156.193
68	169.5	97.242	90.433	187.431
69	234.1	100.717	97.242	240.740
70	280.1	100.992	100.717	278.107
71	43.7	97.542	100.992	43.271
72	30.7	97.292	97.542	31.474
73	35.9	100.283	97.292	36.899
74	0	100.258	100.283	0.000
75	46.5	103.775	100.258	46.380
76	58.2	106.883	103.775	56.083
77	103.8	101.692	106.883	97.115
78	19.6	96.208	101.692	19.274
79	108.8	94.242	96.208	113.088
80	60.7	85.175	94.242	64.409
81	213.5	83.458	85.175	250.660
82	140.5	71.825	83.458	168.347
83	15.6	69.483	71.825	21.719
84	0.8	66.992	69.483	1.151
85	7.8	64.650	66.992	11.643
86	23.9	66.642	64.650	36.968
87	0	62.767	66.642	0.000
88	8.6	58.633	62.767	13.702
89	273.7	72.792	58.633	466.799
90	53.8	75.642	72.792	73.910
91	272.2	89.258	75.642	359.855
92	40.4	87.567	89.258	45.262
93	248	90.442	87.567	283.213
94	108.9	87.808	90.442	120.409
95	0	86.508	87.808	0.000
96	0	86.442	86.508	0.000
97	0	85.792	86.442	0.000
98	0	83.800	85.792	0.000

ตาราง 3.1 (ต่อ)

เดือน	ข้อมูล Y	ค่าเฉลี่ยเคลื่อนที่ 12 เดือน (M_t)	ค่าแนวโน้ม T	Y/T = SCI
99	0	83.800	83.800	0.000
100	39.4	86.367	83.800	47.017
101	156.5	76.600	86.367	181.204
102	111.6	81.417	76.600	145.692
103	44.8	62.467	81.417	55.026
104	89.8	66.583	62.467	143.757
105	362.1	76.092	66.583	543.830
106	33.6	69.817	76.092	44.157
107	0	69.817	69.817	0.000
108	0	69.817	69.817	0.000
109	0	69.817	69.817	0.000
110	0	69.817	69.817	0.000
111	37.2	72.917	69.817	53.282
112	19.1	71.225	72.917	26.194
113	277.7	81.325	71.225	389.891
114	52.2	76.375	81.325	64.187
115	66.1	78.150	76.375	86.547
116	156	83.667	78.150	199.616
117	297.9	78.317	83.667	356.056
118	185.7	90.992	78.317	237.114
119	71.1	96.917	90.992	78.139
120	0	96.917	96.917	0.000
121	0	96.917	96.917	0.000
122	0.05	96.921	96.917	0.052
123	0.3	93.846	96.921	0.310
124	123.1	102.513	93.846	131.173
125	234.7	98.929	102.513	228.948
126	77.4	101.029	98.929	78.238
127	72.7	101.579	101.029	71.959
128	78.8	95.146	101.579	77.575
129	90.6	77.871	95.146	95.222
130	112	71.729	77.871	143.828

ตาราง 3.1 (ต่อ)

เดือน	ข้อมูล Y	ค่าเฉลี่ยเคลื่อนที่ 12 เดือน (M_t)	ค่าแนวโน้ม T	Y/T = SCI
131	217.2	83.904	71.729	302.806
132	0	83.904	83.904	0.000
133	0.05	83.908	83.904	0.060
134	0	83.904	83.908	0.000
135	2.6	84.096	83.904	3.099
136	28.6	76.221	84.096	34.009
137	197.4	73.113	76.221	258.984
138	91.4	74.279	73.113	125.013
139	38.9	71.463	74.279	52.370
140	62.3	70.088	71.463	87.179
141	113.2	71.971	70.088	161.512
142	182.4	77.838	71.971	253.436
143	18.6	61.288	77.838	23.896
144	0	61.288	61.288	0.000
145	0.4	61.317	61.288	0.653
146	0	61.317	61.317	0.000
147	0.05	61.104	61.317	0.082
148	0.6	58.771	61.104	0.982
149	175.2	56.921	58.771	298.107
150	98.9	57.546	56.921	173.750
151	59.7	59.279	57.546	103.743
152	188.9	69.829	59.279	318.662
153	169	74.479	69.829	242.019
154	289	83.363	74.479	388.028
155	214	99.646	83.363	256.710
156	14.1	100.821	99.646	14.150
157	0.05	100.792	100.821	0.050
158	21.7	102.600	100.792	21.530
159	0	102.596	102.600	0.000
160	43.2	106.146	102.596	42.107
161	116.4	101.246	106.146	109.660
162	106.8	101.904	101.246	105.486

ตาราง 3.1 (ต่อ)

เดือน	ข้อมูล Y	ค่าเฉลี่ยเคลื่อนที่ 12 เดือน (M_t)	ค่าแนวโน้ม T	Y/T = SCI
163	60.9	102.004	101.904	59.762
164	71.7	92.238	102.004	70.291
165	214.6	96.038	92.238	232.660
166	248.7	92.679	96.038	258.961
167	2.6	75.063	92.679	2.805
168	0	73.888	75.063	0.000
169	0	73.883	73.888	0.000
170	0	72.075	73.883	0.000
171	0.8	72.142	72.075	1.110
172	40.4	71.908	72.142	56.001
173	148.4	74.575	71.908	206.374
174	59.9	70.667	74.575	80.322
175	61.5	70.717	70.667	87.028
176	37.7	67.883	70.717	53.311
177	307.3	75.608	67.883	452.688
178	194.2	71.067	75.608	256.850
179	118.2	80.700	71.067	166.323
180	0	80.700	80.700	0.000
181	0	80.700	80.700	0.000
182	0	80.700	80.700	0.000
183	0.05	80.638	80.700	0.062
184	35	80.188	80.638	43.404
185	196.3	84.179	80.188	244.801
186	57.7	83.996	84.179	68.544
187	21.8	80.688	83.996	25.954
188	120.3	87.571	80.688	149.094
189	228.6	81.013	87.571	261.046
190	128.8	75.563	81.013	158.988
191	0.2	65.729	75.563	0.265
192	6.1	66.238	65.729	9.281
193	0	66.238	66.238	0.000
194	0	66.238	66.238	0.000

ตาราง 3.1 (ต่อ)

เดือน	ข้อมูล Y	ค่าเฉลี่ยเคลื่อนที่ 12 เดือน (M_t)	ค่าแนวโน้ม T	Y/T = SCI
195	26.4	68.433	66.238	39.857
196	72.6	71.567	68.433	106.089
197	73.3	61.317	71.567	102.422
198	169.6	70.642	61.317	276.597
199	15.6	70.125	70.642	22.083
200	256.5	81.475	70.125	365.775
201	229.4	81.542	81.475	281.559
202	139.5	82.433	81.542	171.078
203	89.5	89.875	82.433	108.573
204	0	89.367	89.875	0.000
205	0	89.367	89.367	0.000
206	0.1	89.375	89.367	0.112
207	0	87.175	89.375	0.000
208	69.8	86.942	87.175	80.069
209	168.5	94.875	86.942	193.808
210	244.3	101.100	94.875	257.497
211	180.3	114.825	101.100	178.338
212	68.4	99.150	114.825	59.569
213	183.2	95.300	99.150	184.771
214	414.1	118.183	95.300	434.523
215	46.4	114.592	118.183	39.261
216	0	114.592	114.592	0.000
217	0.7	114.650	114.592	0.611
218	10.4	115.508	114.650	9.071
219	36.7	118.567	115.508	31.773
220	0.05	112.754	118.567	0.042
221	133	109.796	112.754	117.956
222	80.7	96.163	109.796	73.500
223	59.4	86.088	96.163	61.770
224	29.6	82.854	86.088	34.384
225	76.4	73.954	82.854	92.210
226	360.9	69.521	73.954	488.005

ตาราง 3.1 (ต่อ)

เดือน	ข้อมูล Y	ค่าเฉลี่ยเคลื่อนที่ 12 เดือน (M_t)	ค่าแนวโน้ม T	Y/T = SCI
227	5.7	66.129	69.521	8.199
228	0	66.129	66.129	0.000
229	0.05	66.075	66.129	0.076
230	0	65.208	66.075	0.000
231	2	62.317	65.208	3.067
232	89.8	69.796	62.317	144.103
233	221.8	77.196	69.796	317.784
234	28.5	72.846	77.196	36.919
235	19	69.479	72.846	26.082
236	74	73.179	69.479	106.507
237	175.8	81.463	73.179	240.232
238	297.5	76.179	81.463	365.199
239	19.8	77.354	76.179	25.991
240	0	77.354	77.354	0.000
241	0.5	77.392	77.354	0.646
242	0	77.392	77.392	0.000
243	2.4	77.425	77.392	3.101
244	54.3	74.467	77.425	70.132
245	40.7	59.375	74.467	54.655
246	149.9	69.492	59.375	252.463
247	57.6	72.708	69.492	82.888
248	160.3	79.900	72.708	220.470
249	94.6	73.133	79.900	118.398
250	316.4	74.708	73.133	432.634
251	15.8	74.375	74.708	21.149
252	5.7	74.850	74.375	7.664
253	7.5	75.433	74.850	10.020
254	90.9	83.008	75.433	120.504
255	0	82.808	83.008	0.000
256	22.7	80.175	82.808	27.413
257	6.6	77.333	80.175	8.232
258	75.7	71.150	77.333	97.888

ตาราง 3.1 (ต่อ)

เดือน	ข้อมูล Y	ค่าเฉลี่ยเคลื่อนที่ 12 เดือน (M_t)	ค่าแนวโน้ม T	Y/T = SCI
259	202.1	83.192	71.150	284.048
260	111.1	79.092	83.192	133.547
261	234.4	90.742	79.092	296.365
262	230.8	83.608	90.742	254.348
263	1.4	82.408	83.608	1.674
264	63.7	87.242	82.408	77.298
265	0	86.617	87.242	0.000
266	0	79.042	86.617	0.000
267	22.9	80.950	79.042	28.972
268	119.4	89.008	80.950	147.498
269	133.5	99.583	89.008	149.986
270	5.7	93.750	99.583	5.724
271	49.6	81.042	93.750	52.907
272	71.1	77.708	81.042	87.733
273	213.3	75.950	77.708	274.488
274	152.5	69.425	75.950	200.790
275	0	69.308	69.425	0.000
276	0	64.000	69.308	0.000
277	0	64.000	64.000	0.000
278	0	64.000	64.000	0.000
279	36.8	65.158	64.000	57.500
280	74.2	61.392	65.158	113.876
281	363.1	80.525	61.392	591.448
282	105.2	88.817	80.525	130.643
283	71.1	90.608	88.817	80.053
284	134.1	95.858	90.608	148.000
285	34.6	80.967	95.858	36.095
286	118.8	78.158	80.967	146.727
287	6.4	78.692	78.158	8.189
288	0	78.692	78.692	0.000
289	0.05	78.696	78.692	0.064
290	0	78.696	78.696	0.000

ตาราง 3.1 (ต่อ)

เดือน	ข้อมูล Y	ค่าเฉลี่ยเคลื่อนที่ 12 เดือน (M_t)	ค่าแนวโน้ม T	Y/T = SCI
291	15.8	76.946	78.696	20.077
292	61.3	75.871	76.946	79.666
293	177.2	60.379	75.871	233.555
294	55.5	56.238	60.379	91.919
295	76.1	56.654	56.238	135.319
296	117.2	55.246	56.654	206.869
297	234.5	71.904	55.246	424.466
298	105.3	70.779	71.904	146.445
299	28.2	72.596	70.779	39.842
300	0	72.596	72.596	0.000
301	0	72.592	72.596	0.000
302	30.6	75.142	72.592	42.154
303	44	77.492	75.142	58.556
304	155.6	85.350	77.492	200.796
305	228.5	89.625	85.350	267.721
306	250.2	105.850	89.625	279.163
307	138.6	111.058	105.850	130.940
308	167.1	115.217	111.058	150.461
309	375.9	127.000	115.217	326.255
310	81.2	124.992	127.000	63.937
311	77.2	129.075	124.992	61.764
312	0.05	129.079	129.075	0.039
313	0	129.079	129.079	0.000
314	0	126.529	129.079	0.000
315	44.3	126.554	126.529	35.012
316	74.9	119.829	126.554	59.184
317	65.4	106.238	119.829	54.578
318	17.5	86.846	106.238	16.473
319	90.9	82.871	86.846	104.668
320	221.5	87.404	82.871	267.283
321	204.2	73.096	87.404	233.627
322	63.6	71.629	73.096	87.009
323	17.3	66.638	71.629	24.152

ตาราง 3.1 (ต่อ)

เดือน	ข้อมูล Y	ค่าเฉลี่ยเคลื่อนที่ 12 เดือน (M_t)	ค่าแนวโน้ม T	Y/T = SCI
324	0	66.633	66.638	0.000
325	0	66.633	66.633	0.000
326	0	66.633	66.633	0.000
327	0	62.942	66.633	0.000
328	0.05	56.704	62.942	0.079
329	90.1	58.763	56.704	158.895
330	56.1	61.979	58.763	95.469
331	84.1	61.413	61.979	135.691
332	110.8	52.188	61.413	180.419
333	225.2	53.938	52.188	431.521
334	153.2	61.404	53.938	284.032
335	42.1	63.471	61.404	68.562
336	1.9	63.629	63.471	2.994
337	0.9	63.704	63.629	1.414
338	9.1	64.463	63.704	14.285
339	2.8	64.696	64.463	4.344
340	179.1	79.617	64.696	276.834
341	315.2	98.375	79.617	395.897
342	60.6	98.750	98.375	61.601
343	36.1	94.750	98.750	36.557
344	104.8	94.250	94.750	110.607
345	178.6	90.367	94.250	189.496
346	264.4	99.633	90.367	292.586
347	42.7	99.683	99.633	42.857
348	6.4	100.058	99.683	6.420
349	0	99.983	100.058	0.000
350	30.8	101.792	99.983	30.805
351	7.3	102.167	101.792	7.172
352	178.7	102.133	102.167	174.910
353	286.4	99.733	102.133	280.418
354	101.2	103.117	99.733	101.471
355	19.4	101.725	103.117	18.814
356	150.2	105.508	101.725	147.653

ตาราง 3.1 (ต่อ)

เดือน	ข้อมูล Y	ค่าเฉลี่ยเคลื่อนที่ 12 เดือน (M_t)	ค่าแนวโน้ม T	Y/T = SCI
357	247.6	111.258	105.508	234.673
358	324.8	116.292	111.258	291.933
359	7.4	113.350	116.292	6.363
360	0	112.817	113.350	0.000
361	0	112.817	112.817	0.000
362	0	110.250	112.817	0.000
363	193.8	125.792	110.250	175.782
364	0	110.900	125.792	0.000
365	398.7	120.258	110.900	359.513
366	30.2	114.342	120.258	25.113
367	48.8	116.792	114.342	42.679
368	53.8	108.758	116.792	46.065
369	150.1	100.633	108.758	138.012
370	290.3	97.758	100.633	288.473
371	22.9	99.050	97.758	23.425
372	12.3	100.075	99.050	12.418

2) ดัชนีฤดูกาล (S) ในการคำนวณค่าดัชนีฤดูกาลจะใช้วิธีอัตราส่วนต่อค่าแนวโน้มจากการหาค่าแนวโน้มโดยวิธีค่าเฉลี่ยเคลื่อนที่ครั้งละ 12 เดือนดังตาราง 3.1 เมื่อทำการหาค่าแนวโน้มโดยการหารข้อมูลจริงด้วยค่าแนวโน้ม (Y/T) จะได้ค่า SCI และใช้ SCI นี้ไปหาดัชนีฤดูกาลดังตาราง 3.2

ตาราง 3.2 แสดงค่าดัชนีฤดูกาล

ปี	เดือน											
	ม.ค.	ก.พ.	มี.ค.	เม.ย.	พ.ค.	มิ.ย.	ก.ค.	ส.ค.	ก.ย.	ต.ค.	พ.ย.	ธ.ค.
2514	*	*	*	*	*	*	*	*	*	*	*	*
2515	0.813	3.596	8.443	86.936	123.441	90.370	82.593	58.821	557.169	246.272	126.825	32.415
2516	0.000	0.000	133.501	0.000	350.234	122.292	32.181	101.146	281.188	200.813	6.136	0.000
2517	0.000	0.000	56.877	114.052	226.214	44.911	86.414	119.589	242.189	288.012	156.830	3.195
2518	62.582	0.000	0.000	2.674	175.711	99.428	57.283	79.661	180.460	275.857	86.411	36.874
2519	0.000	0.343	4.913	23.784	185.915	98.643	156.193	187.431	240.740	278.107	43.271	31.474
2520	36.899	0.000	46.380	56.083	97.115	19.274	113.088	64.409	250.660	168.347	21.719	1.151
2521	11.643	36.968	0.000	13.702	466.799	73.910	359.855	45.262	283.213	120.409	0.000	0.000
2522	0.000	0.000	0.000	47.017	181.204	145.692	55.026	143.757	543.830	44.157	0.000	0.000
2523	0.000	0.000	53.282	26.194	389.891	64.187	86.547	199.616	356.056	237.114	78.139	0.000
2524	0.000	0.052	0.310	131.173	228.948	78.238	71.959	77.575	95.222	143.828	302.806	0.000
2525	0.060	0.000	3.099	34.009	258.984	125.013	52.370	87.179	161.512	253.436	23.896	0.000
2526	0.653	0.000	0.082	0.982	298.107	173.750	103.743	318.662	242.019	388.028	256.710	14.150
2527	0.050	21.530	0.000	42.107	109.660	105.486	59.762	70.291	232.660	258.961	2.805	0.000
2528	0.000	0.000	1.110	56.001	206.374	80.322	87.028	53.311	452.688	256.850	166.323	0.000
2529	0.000	0.000	0.062	43.404	244.801	68.544	25.954	149.094	261.046	158.988	0.265	9.281
2530	0.000	0.000	39.857	106.089	102.422	276.597	22.083	365.775	281.559	171.078	108.573	0.000
2531	0.000	0.112	0.000	80.069	193.808	257.497	178.338	59.569	184.771	434.523	39.261	0.000
2532	0.611	9.071	31.773	0.042	117.956	73.500	61.770	34.384	92.210	488.005	8.199	0.000
2533	0.076	0.000	3.067	144.103	317.784	36.919	26.082	106.507	240.232	365.199	25.991	0.000
2534	0.646	0.000	3.101	70.132	54.655	252.463	82.888	220.470	118.398	432.634	21.149	7.664
2535	10.020	120.504	0.000	27.413	8.232	97.888	284.048	133.547	296.365	254.348	1.674	77.298
2536	0.000	0.000	28.972	147.498	149.986	5.724	52.907	87.733	274.488	200.790	0.000	0.000
2537	0.000	0.000	57.500	113.876	591.448	130.643	80.053	148.000	36.095	146.727	8.189	0.000
2538	0.064	0.000	20.077	79.666	233.555	91.919	135.319	206.869	424.466	146.445	39.842	0.000
2539	0.000	42.154	58.556	200.796	267.721	279.163	130.940	150.461	326.255	63.937	61.764	0.039
2540	0.000	0.000	35.012	59.184	54.578	16.473	104.668	267.283	233.627	87.009	24.152	0.000
2541	0.000	0.000	0.000	0.079	158.895	95.469	135.691	180.419	431.521	284.032	68.562	2.994
2542	1.414	14.285	4.344	276.834	395.897	61.601	36.557	110.607	189.496	292.586	42.857	6.420
2543	0.000	30.805	7.172	174.910	280.418	101.471	18.814	147.653	234.673	291.933	6.363	0.000
2544	0.000	0.000	175.782	0.000	359.513	25.113	42.679	46.065	138.012	288.473	23.425	12.418
รวม	125.530	279.419	773.272	2158.809	6830.268	3192.497	2822.832	4021.146	7882.823	7266.899	1752.139	235.372
ค่าเฉลี่ย	4.184	9.314	25.776	71.960	227.676	106.417	94.094	134.038	262.761	242.230	58.405	7.846
S	4.034	8.979	24.850	69.376	219.499	102.595	90.715	129.225	253.324	233.531	56.307	7.564

จากตาราง 3.2 พบว่าเมื่อนำค่าดัชนีฤดูกาลของทุกเดือนมารวมกันจะได้เท่ากับ 1,200 เพราะเป็นค่าดัชนีฤดูกาลที่ปรับแล้ว (normalized seasonal index) เนื่องจากเรากำหนดค่าดัชนีฤดูกาลในรูปแบบเปอร์เซ็นต์ นั่นหมายถึง ถ้าปริมาณน้ำฝนในเดือนใดมีค่าดัชนีฤดูกาลเท่ากับ 100 แสดงว่าไม่มีอิทธิพลของฤดูกาลต่อปริมาณน้ำฝน แต่ถ้าค่าดัชนีฤดูกาลในเดือนใดมีค่ามากกว่า 100 แสดงว่าอิทธิพลของฤดูกาลต่อปริมาณน้ำฝนในเดือนนั้นสูงกว่าปริมาณน้ำฝนเฉลี่ย และถ้าค่าดัชนีฤดูกาลใดมีค่าน้อยกว่า 100 แสดงว่าอิทธิพลของฤดูกาลในเดือนนั้นทำให้ปริมาณน้ำฝนต่ำกว่าปริมาณน้ำฝนเฉลี่ย

3) การพยากรณ์

จากรูปแบบของการพยากรณ์คือ $\hat{Y} = T \times S$ เมื่อได้ส่วนของค่าแนวโน้ม (T) และดัชนีฤดูกาล (S) แล้วทำการหาค่าพยากรณ์ และ ค่าความคลาดเคลื่อน ดังแสดงในตาราง 3.3 ซึ่งวิธีค่าเฉลี่ยเคลื่อนที่แบบธรรมดาที่คำนวณค่า MSE และ MAD ได้

$$MSE = 4,011.629 \quad MAD = 42.300$$

ตาราง 3.3 แสดงการพยากรณ์อนุกรมเวลาโดยการเฉลี่ยเคลื่อนที่แบบธรรมดาครั้งละ 12 เดือน

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
1	0	*	*	*	*	*	*
2	0	*	*	*	*	*	*
3	13.7	*	*	*	*	*	*
4	14.1	*	*	*	*	*	*
5	222.7	*	*	*	*	*	*
6	55.6	*	*	*	*	*	*
7	101.4	*	*	*	*	*	*
8	194.9	*	*	*	*	*	*
9	182.1	*	*	*	*	*	*
10	210.6	*	*	*	*	*	*
11	20.4	*	*	*	*	*	*
12	18.2	*	*	*	*	*	*
13	0.7	86.142	4.034	3.475	-2.775	7.701	2.775
14	3.1	86.200	8.979	7.740	-4.640	21.532	4.640
15	7.3	86.458	24.850	21.485	-14.185	201.213	14.185
16	74.7	85.925	69.376	59.611	15.089	227.667	15.089
17	112.3	90.975	219.499	199.689	-87.389	7636.909	87.389
18	73.9	81.775	102.595	83.897	-9.997	99.940	9.997
19	68.8	83.300	90.715	75.566	-6.766	45.776	6.766
20	47.4	80.583	129.225	104.133	-56.733	3218.686	56.733

ตาราง 3.3 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
21	380.5	68.292	253.324	172.999	207.501	43056.479	207.501
22	208.9	84.825	233.531	198.093	10.807	116.800	10.807
23	107.4	84.683	56.307	47.683	59.717	3566.145	59.717
24	29.8	91.933	7.564	6.954	22.846	521.948	22.846
25	0	92.900	4.034	3.748	-3.748	14.045	3.748
26	0	92.842	8.979	8.337	-8.337	69.500	8.337
27	123.6	92.583	24.850	23.007	100.593	10118.949	100.593
28	0	102.275	69.376	70.954	-70.954	5034.519	70.954
29	336.4	96.050	219.499	210.829	125.571	15768.077	125.571
30	140.3	114.725	102.595	117.702	22.598	510.670	22.598
31	38.7	120.258	90.715	109.093	-70.393	4955.123	70.393
32	119.1	117.750	129.225	152.162	-33.062	1093.091	33.062
33	347.9	123.725	253.324	313.426	34.474	1188.484	34.474
34	243	121.008	233.531	282.592	-39.592	1567.516	39.592
35	7.6	123.850	56.307	69.736	-62.136	3860.936	62.136
36	0	115.533	7.564	8.739	-8.739	76.369	8.739
37	0	113.050	4.034	4.560	-4.560	20.798	4.560
38	0	113.050	8.979	10.151	-10.151	103.049	10.151
39	64.3	113.050	24.850	28.093	36.207	1310.947	36.207
40	123.3	108.108	69.376	75.001	48.299	2332.767	48.299
41	267.8	118.383	219.499	259.850	7.950	63.195	7.950
42	50.6	112.667	102.595	115.590	-64.990	4223.733	64.990
43	90.9	105.192	90.715	95.425	-4.525	20.474	4.525
44	131	109.542	129.225	141.555	-10.555	111.403	10.555
45	267.7	110.533	253.324	280.008	-12.308	151.484	12.308
46	299.1	103.850	233.531	242.522	56.578	3201.086	56.578
47	170.2	108.525	56.307	61.107	109.093	11901.204	109.093
48	3.9	122.075	7.564	9.234	-5.334	28.449	5.334
49	76.6	122.400	4.034	4.938	71.662	5135.488	71.662
50	0	128.783	8.979	11.564	-11.564	133.728	11.564
51	0	128.783	24.850	32.003	-32.003	1024.175	32.003
52	3.3	123.425	69.376	85.627	-82.327	6777.796	82.327
53	199.3	113.425	219.499	248.967	-49.667	2466.809	49.667
54	107.1	107.717	102.595	110.512	-3.412	11.640	3.412
55	64.4	112.425	90.715	101.987	-37.587	1412.753	37.587
56	87.8	110.217	129.225	142.427	-54.627	2984.111	54.627

ตาราง 3.3 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
57	192.4	106.617	253.324	270.086	-77.686	6035.118	77.686
58	276.8	100.342	233.531	234.329	42.471	1803.802	42.471
59	85.1	98.483	56.307	55.453	29.647	878.934	29.647
60	33.7	91.392	7.564	6.913	26.787	717.552	26.787
61	0	93.875	4.034	3.787	-3.787	14.341	3.787
62	0.3	87.492	8.979	7.856	-7.556	57.098	7.556
63	4.3	87.517	24.850	21.748	-17.448	304.431	17.448
64	20.9	87.875	69.376	60.964	-40.064	1605.139	40.064
65	166.1	89.342	219.499	196.104	-30.004	900.255	30.004
66	85.4	86.575	102.595	88.822	-3.422	11.707	3.422
67	132.4	84.767	90.715	76.896	55.504	3080.662	55.504
68	169.5	90.433	129.225	116.862	52.638	2770.750	52.638
69	234.1	97.242	253.324	246.337	-12.237	149.741	12.237
70	280.1	100.717	233.531	235.205	44.895	2015.601	44.895
71	43.7	100.992	56.307	56.866	-13.166	173.332	13.166
72	30.7	97.542	7.564	7.378	23.322	543.915	23.322
73	35.9	97.292	4.034	3.925	31.975	1022.414	31.975
74	0	100.283	8.979	9.005	-9.005	81.089	9.005
75	46.5	100.258	24.850	24.914	21.586	465.944	21.586
76	58.2	103.775	69.376	71.995	-13.795	190.302	13.795
77	103.8	106.883	219.499	234.608	-130.808	17110.753	130.808
78	19.6	101.692	102.595	104.330	-84.730	7179.252	84.730
79	108.8	96.208	90.715	87.276	21.524	463.299	21.524
80	60.7	94.242	129.225	121.783	-61.083	3731.180	61.083
81	213.5	85.175	253.324	215.769	-2.269	5.149	2.269
82	140.5	83.458	233.531	194.901	-54.401	2959.470	54.401
83	15.6	71.825	56.307	40.443	-24.843	617.156	24.843
84	0.8	69.483	7.564	5.256	-4.456	19.853	4.456
85	7.8	66.992	4.034	2.702	5.098	25.985	5.098
86	23.9	64.650	8.979	5.805	18.095	327.421	18.095
87	0	66.642	24.850	16.560	-16.560	274.250	16.560
88	8.6	62.767	69.376	43.545	-34.945	1221.155	34.945
89	273.7	58.633	219.499	128.700	145.000	21025.085	145.000
90	53.8	72.792	102.595	74.681	-20.881	435.997	20.881
91	272.2	75.642	90.715	68.619	203.581	41445.419	203.581
92	40.4	89.258	129.225	115.344	-74.944	5616.558	74.944

ตาราง 3.3 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
93	248	87.567	253.324	221.828	26.172	684.988	26.172
94	108.9	90.442	233.531	211.209	-102.309	10467.183	102.309
95	0	87.808	56.307	49.442	-49.442	2444.550	49.442
96	0	86.508	7.564	6.543	-6.543	42.817	6.543
97	0	86.442	4.034	3.487	-3.487	12.160	3.487
98	0	85.792	8.979	7.704	-7.704	59.346	7.704
99	0	83.800	24.850	20.824	-20.824	433.654	20.824
100	39.4	83.800	69.376	58.137	-18.737	351.080	18.737
101	156.5	86.367	219.499	189.574	-33.074	1093.900	33.074
102	111.6	76.600	102.595	78.588	33.012	1089.812	33.012
103	44.8	81.417	90.715	73.857	-29.057	844.328	29.057
104	89.8	62.467	129.225	80.722	9.078	82.405	9.078
105	362.1	66.583	253.324	168.672	193.428	37414.460	193.428
106	33.6	76.092	233.531	177.698	-144.098	20764.108	144.098
107	0	69.817	56.307	39.312	-39.312	1545.417	39.312
108	0	69.817	7.564	5.281	-5.281	27.888	5.281
109	0	69.817	4.034	2.816	-2.816	7.932	2.816
110	0	69.817	8.979	6.269	-6.269	39.302	6.269
111	37.2	69.817	24.850	17.349	19.851	394.043	19.851
112	19.1	72.917	69.376	50.587	-31.487	991.412	31.487
113	277.7	71.225	219.499	156.338	121.362	14728.658	121.362
114	52.2	81.325	102.595	83.435	-31.235	975.644	31.235
115	66.1	76.375	90.715	69.284	-3.184	10.136	3.184
116	156	78.150	129.225	100.989	55.011	3026.210	55.011
117	297.9	83.667	253.324	211.948	85.952	7387.734	85.952
118	185.7	78.317	233.531	182.894	2.806	7.876	2.806
119	71.1	90.992	56.307	51.235	19.865	394.625	19.865
120	0	96.917	7.564	7.331	-7.331	53.740	7.331
121	0	96.917	4.034	3.910	-3.910	15.286	3.910
122	0.05	96.917	8.979	8.703	-8.653	74.868	8.653
123	0.3	96.921	24.850	24.085	-23.785	565.721	23.785
124	123.1	93.846	69.376	65.107	57.993	3363.244	57.993
125	234.7	102.513	219.499	225.014	9.686	93.816	9.686
126	77.4	98.929	102.595	101.496	-24.096	580.631	24.096
127	72.7	101.029	90.715	91.649	-18.949	359.059	18.949
128	78.8	101.579	129.225	131.265	-52.465	2752.602	52.465

ตาราง 3.3 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
129	90.6	95.146	253.324	241.028	-150.428	22628.463	150.428
130	112	77.871	233.531	181.852	-69.852	4879.367	69.852
131	217.2	71.729	56.307	40.389	176.811	31262.248	176.811
132	0	83.904	7.564	6.346	-6.346	40.278	6.346
133	0.05	83.904	4.034	3.385	-3.335	11.120	3.335
134	0	83.908	8.979	7.535	-7.535	56.769	7.535
135	2.6	83.904	24.850	20.850	-18.250	333.071	18.250
136	28.6	84.096	69.376	58.342	-29.742	884.608	29.742
137	197.4	76.221	219.499	167.304	30.096	905.761	30.096
138	91.4	73.113	102.595	75.010	16.390	268.642	16.390
139	38.9	74.279	90.715	67.383	-28.483	811.254	28.483
140	62.3	71.463	129.225	92.347	-30.047	902.829	30.047
141	113.2	70.088	253.324	177.549	-64.349	4140.759	64.349
142	182.4	71.971	233.531	168.074	14.326	205.230	14.326
143	18.6	77.838	56.307	43.828	-25.228	636.457	25.228
144	0	61.288	7.564	4.636	-4.636	21.490	4.636
145	0.4	61.288	4.034	2.472	-2.072	4.295	2.072
146	0	61.317	8.979	5.506	-5.506	30.315	5.506
147	0.05	61.317	24.850	15.237	-15.187	230.652	15.187
148	0.6	61.104	69.376	42.392	-41.792	1746.542	41.792
149	175.2	58.771	219.499	129.002	46.198	2134.300	46.198
150	98.9	56.921	102.595	58.398	40.502	1640.422	40.502
151	59.7	57.546	90.715	52.203	7.497	56.207	7.497
152	188.9	59.279	129.225	76.603	112.297	12610.560	112.297
153	169	69.829	253.324	176.894	-7.894	62.320	7.894
154	289	74.479	233.531	173.932	115.068	13240.672	115.068
155	214	83.363	56.307	46.939	167.061	27909.356	167.061
156	14.1	99.646	7.564	7.537	6.563	43.071	6.563
157	0.05	100.821	4.034	4.067	-4.017	16.138	4.017
158	21.7	100.792	8.979	9.051	12.649	160.008	12.649
159	0	102.600	24.850	25.496	-25.496	650.054	25.496
160	43.2	102.596	69.376	71.177	-27.977	782.708	27.977
161	116.4	106.146	219.499	232.989	-116.589	13593.058	116.589
162	106.8	101.246	102.595	103.873	2.927	8.567	2.927
163	60.9	101.904	90.715	92.443	-31.543	994.936	31.543
164	71.7	102.004	129.225	131.814	-60.114	3613.747	60.114

ตาราง 3.3 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
165	214.6	92.238	253.324	233.660	-19.060	363.287	19.060
166	248.7	96.038	233.531	224.277	24.423	596.471	24.423
167	2.6	92.679	56.307	52.185	-49.585	2458.674	49.585
168	0	75.063	7.564	5.678	-5.678	32.236	5.678
169	0	73.888	4.034	2.981	-2.981	8.884	2.981
170	0	73.883	8.979	6.634	-6.634	44.014	6.634
171	0.8	72.075	24.850	17.911	-17.111	292.775	17.111
172	40.4	72.142	69.376	50.049	-9.649	93.104	9.649
173	148.4	71.908	219.499	157.838	-9.438	89.080	9.438
174	59.9	74.575	102.595	76.510	-16.610	275.897	16.610
175	61.5	70.667	90.715	64.105	-2.605	6.788	2.605
176	37.7	70.717	129.225	91.383	-53.683	2881.898	53.683
177	307.3	67.883	253.324	171.965	135.335	18315.552	135.335
178	194.2	75.608	233.531	176.569	17.631	310.858	17.631
179	118.2	71.067	56.307	40.016	78.184	6112.796	78.184
180	0	80.700	7.564	6.104	-6.104	37.260	6.104
181	0	80.700	4.034	3.255	-3.255	10.598	3.255
182	0	80.700	8.979	7.246	-7.246	52.511	7.246
183	0.05	80.700	24.850	20.054	-20.004	400.160	20.004
184	35	80.638	69.376	55.943	-20.943	438.613	20.943
185	196.3	80.188	219.499	176.011	20.289	411.646	20.289
186	57.7	84.179	102.595	86.364	-28.664	821.598	28.664
187	21.8	83.996	90.715	76.197	-54.397	2959.036	54.397
188	120.3	80.688	129.225	104.268	16.032	257.023	16.032
189	228.6	87.571	253.324	221.838	6.762	45.721	6.762
190	128.8	81.013	233.531	189.189	-60.389	3646.859	60.389
191	0.2	75.563	56.307	42.547	-42.347	1793.277	42.347
192	6.1	65.729	7.564	4.972	1.128	1.273	1.128
193	0	66.238	4.034	2.672	-2.672	7.140	2.672
194	0	66.238	8.979	5.948	-5.948	35.376	5.948
195	26.4	66.238	24.850	16.460	9.940	98.802	9.940
196	72.6	68.433	69.376	47.476	25.124	631.199	25.124
197	73.3	71.567	219.499	157.088	-83.788	7020.474	83.788
198	169.6	61.317	102.595	62.908	106.692	11383.231	106.692
199	15.6	70.642	90.715	64.083	-48.483	2350.578	48.483
200	256.5	70.125	129.225	90.619	165.881	27516.596	165.881

ตาราง 3.3 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
201	229.4	81.475	253.324	206.396	23.004	529.182	23.004
202	139.5	81.542	233.531	190.425	-50.925	2593.356	50.925
203	89.5	82.433	56.307	46.416	43.084	1856.242	43.084
204	0	89.875	7.564	6.798	-6.798	46.214	6.798
205	0	89.367	4.034	3.605	-3.605	12.997	3.605
206	0.1	89.367	8.979	8.025	-7.925	62.800	7.925
207	0	89.375	24.850	22.210	-22.210	493.273	22.210
208	69.8	87.175	69.376	60.479	9.321	86.889	9.321
209	168.5	86.942	219.499	190.836	-22.336	498.909	22.336
210	244.3	94.875	102.595	97.337	146.963	21598.149	146.963
211	180.3	101.100	90.715	91.713	88.587	7847.637	88.587
212	68.4	114.825	129.225	148.382	-79.982	6397.138	79.982
213	183.2	99.150	253.324	251.171	-67.971	4620.075	67.971
214	414.1	95.300	233.531	222.555	191.545	36689.502	191.545
215	46.4	118.183	56.307	66.546	-20.146	405.849	20.146
216	0	114.592	7.564	8.668	-8.668	75.129	8.668
217	0.7	114.592	4.034	4.623	-3.923	15.387	3.923
218	10.4	114.650	8.979	10.295	0.105	0.011	0.105
219	36.7	115.508	24.850	28.704	7.996	63.938	7.996
220	0.05	118.567	69.376	82.257	-82.207	6757.967	82.207
221	133	112.754	219.499	247.495	-114.495	13108.993	114.495
222	80.7	109.796	102.595	112.645	-31.945	1020.478	31.945
223	59.4	96.163	90.715	87.234	-27.834	774.734	27.834
224	29.6	86.088	129.225	111.246	-81.646	6666.102	81.646
225	76.4	82.854	253.324	209.890	-133.490	17819.530	133.490
226	360.9	73.954	233.531	172.706	188.194	35417.041	188.194
227	5.7	69.521	56.307	39.145	-33.445	1118.582	33.445
228	0	66.129	7.564	5.002	-5.002	25.020	5.002
229	0.05	66.129	4.034	2.668	-2.618	6.852	2.618
230	0	66.075	8.979	5.933	-5.933	35.203	5.933
231	2	65.208	24.850	16.204	-14.204	201.762	14.204
232	89.8	62.317	69.376	43.233	46.567	2168.501	46.567
233	221.8	69.796	219.499	153.201	68.599	4705.781	68.599
234	28.5	77.196	102.595	79.199	-50.699	2570.388	50.699
235	19	72.846	90.715	66.082	-47.082	2216.740	47.082
236	74	69.479	129.225	89.784	-15.784	249.140	15.784

ตาราง 3.3 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
237	175.8	73.179	253.324	185.381	-9.581	91.789	9.581
238	297.5	81.463	233.531	190.240	107.260	11504.682	107.260
239	19.8	76.179	56.307	42.894	-23.094	533.348	23.094
240	0	77.354	7.564	5.851	-5.851	34.235	5.851
241	0.5	77.354	4.034	3.121	-2.621	6.867	2.621
242	0	77.392	8.979	6.949	-6.949	48.294	6.949
243	2.4	77.392	24.850	19.232	-16.832	283.312	16.832
244	54.3	77.425	69.376	53.714	0.586	0.343	0.586
245	40.7	74.467	219.499	163.454	-122.754	15068.483	122.754
246	149.9	59.375	102.595	60.916	88.984	7918.201	88.984
247	57.6	69.492	90.715	63.040	-5.440	29.589	5.440
248	160.3	72.708	129.225	93.957	66.343	4401.389	66.343
249	94.6	79.900	253.324	202.406	-107.806	11622.174	107.806
250	316.4	73.133	233.531	170.789	145.611	21202.580	145.611
251	15.8	74.708	56.307	42.066	-26.266	689.911	26.266
252	5.7	74.375	7.564	5.626	0.074	0.006	0.074
253	7.5	74.850	4.034	3.019	4.481	20.075	4.481
254	90.9	75.433	8.979	6.774	84.126	7077.265	84.126
255	0	83.008	24.850	20.628	-20.628	425.499	20.628
256	22.7	82.808	69.376	57.449	-34.749	1207.503	34.749
257	6.6	80.175	219.499	175.983	-169.383	28690.768	169.383
258	75.7	77.333	102.595	79.340	-3.640	13.250	3.640
259	202.1	71.150	90.715	64.544	137.556	18921.682	137.556
260	111.1	83.192	129.225	107.504	3.596	12.931	3.596
261	234.4	79.092	253.324	200.358	34.042	1158.825	34.042
262	230.8	90.742	233.531	211.910	18.890	356.838	18.890
263	1.4	83.608	56.307	47.077	-45.677	2086.433	45.677
264	63.7	82.408	7.564	6.233	57.467	3302.417	57.467
265	0	87.242	4.034	3.519	-3.519	12.386	3.519
266	0	86.617	8.979	7.778	-7.778	60.493	7.778
267	22.9	79.042	24.850	19.642	3.258	10.615	3.258
268	119.4	80.950	69.376	56.160	63.240	3999.310	63.240
269	133.5	89.008	219.499	195.373	-61.873	3828.218	61.873
270	5.7	99.583	102.595	102.167	-96.467	9305.964	96.467
271	49.6	93.750	90.715	85.046	-35.446	1256.386	35.446
272	71.1	81.042	129.225	104.726	-33.626	1130.691	33.626

ตาราง 3.3 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
273	213.3	77.708	253.324	196.854	16.446	270.466	16.446
274	152.5	75.950	233.531	177.367	-24.867	618.354	24.867
275	0	69.425	56.307	39.091	-39.091	1528.126	39.091
276	0	69.308	7.564	5.242	-5.242	27.483	5.242
277	0	64.000	4.034	2.582	-2.582	6.666	2.582
278	0	64.000	8.979	5.747	-5.747	33.026	5.747
279	36.8	64.000	24.850	15.904	20.896	436.641	20.896
280	74.2	65.158	69.376	45.204	28.996	840.752	28.996
281	363.1	61.392	219.499	134.754	228.346	52141.792	228.346
282	105.2	80.525	102.595	82.615	22.585	510.103	22.585
283	71.1	88.817	90.715	80.570	-9.470	89.686	9.470
284	134.1	90.608	129.225	117.088	17.012	289.400	17.012
285	34.6	95.858	253.324	242.833	-208.233	43360.790	208.233
286	118.8	80.967	233.531	189.082	-70.282	4939.587	70.282
287	6.4	78.158	56.307	44.009	-37.609	1414.418	37.609
288	0	78.692	7.564	5.952	-5.952	35.429	5.952
289	0.05	78.692	4.034	3.174	-3.124	9.762	3.124
290	0	78.696	8.979	7.066	-7.066	49.935	7.066
291	15.8	78.696	24.850	19.556	-3.756	14.107	3.756
292	61.3	76.946	69.376	53.382	7.918	62.695	7.918
293	177.2	75.871	219.499	166.536	10.664	113.723	10.664
294	55.5	60.379	102.595	61.946	-6.446	41.550	6.446
295	76.1	56.238	90.715	51.016	25.084	629.208	25.084
296	117.2	56.654	129.225	73.211	43.989	1935.023	43.989
297	234.5	55.246	253.324	139.951	94.549	8939.481	94.549
298	105.3	71.904	233.531	167.918	-62.618	3921.071	62.618
299	28.2	70.779	56.307	39.854	-11.654	135.810	11.654
300	0	72.596	7.564	5.491	-5.491	30.152	5.491
301	0	72.596	4.034	2.929	-2.929	8.576	2.929
302	30.6	72.592	8.979	6.518	24.082	579.926	24.082
303	44	75.142	24.850	18.673	25.327	641.470	25.327
304	155.6	77.492	69.376	53.761	101.839	10371.254	101.839
305	228.5	85.350	219.499	187.343	41.157	1693.933	41.157
306	250.2	89.625	102.595	91.951	158.249	25042.847	158.249
307	138.6	105.850	90.715	96.022	42.578	1812.879	42.578
308	167.1	111.058	129.225	143.515	23.585	556.269	23.585

ตาราง 3.3 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
309	375.9	115.217	253.324	291.872	84.028	7060.719	84.028
310	81.2	127.000	233.531	296.584	-215.384	46390.380	215.384
311	77.2	124.992	56.307	70.379	6.821	46.522	6.821
312	0.05	129.075	7.564	9.763	-9.713	94.346	9.713
313	0	129.079	4.034	5.207	-5.207	27.114	5.207
314	0	129.079	8.979	11.591	-11.591	134.343	11.591
315	44.3	126.529	24.850	31.443	12.857	165.313	12.857
316	74.9	126.554	69.376	87.798	-12.898	166.365	12.898
317	65.4	119.829	219.499	263.024	-197.624	39055.277	197.624
318	17.5	106.238	102.595	108.994	-91.494	8371.200	91.494
319	90.9	86.846	90.715	78.782	12.118	146.836	12.118
320	221.5	82.871	129.225	107.089	114.411	13089.767	114.411
321	204.2	87.404	253.324	221.416	-17.216	296.393	17.216
322	63.6	73.096	233.531	170.701	-107.101	11470.703	107.101
323	17.3	71.629	56.307	40.332	-23.032	530.490	23.032
324	0	66.638	7.564	5.040	-5.040	25.406	5.040
325	0	66.633	4.034	2.688	-2.688	7.225	2.688
326	0	66.633	8.979	5.983	-5.983	35.800	5.983
327	0	66.633	24.850	16.558	-16.558	274.181	16.558
328	0.05	62.942	69.376	43.666	-43.616	1902.393	43.616
329	90.1	56.704	219.499	124.465	-34.365	1180.967	34.365
330	56.1	58.763	102.595	60.287	-4.187	17.534	4.187
331	84.1	61.979	90.715	56.225	27.875	777.041	27.875
332	110.8	61.413	129.225	79.360	31.440	988.471	31.440
333	225.2	52.188	253.324	132.204	92.996	8648.318	92.996
334	153.2	53.938	233.531	125.961	27.239	741.977	27.239
335	42.1	61.404	56.307	34.575	7.525	56.626	7.525
336	1.9	63.471	7.564	4.801	-2.901	8.415	2.901
337	0.9	63.629	4.034	2.567	-1.667	2.778	1.667
338	9.1	63.704	8.979	5.720	3.380	11.422	3.380
339	2.8	64.463	24.850	16.019	-13.219	174.741	13.219
340	179.1	64.696	69.376	44.883	134.217	18014.094	134.217
341	315.2	79.617	219.499	174.758	140.442	19723.967	140.442
342	60.6	98.375	102.595	100.928	-40.328	1626.326	40.328
343	36.1	98.750	90.715	89.581	-53.481	2860.249	53.481
344	104.8	94.750	129.225	122.440	-17.640	311.179	17.640

ตาราง 3.3 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
345	178.6	94.250	253.324	238.758	-60.158	3619.013	60.158
346	264.4	90.367	233.531	211.034	53.366	2847.919	53.366
347	42.7	99.633	56.307	56.101	-13.401	179.579	13.401
348	6.4	99.683	7.564	7.540	-1.140	1.300	1.140
349	0	100.058	4.034	4.036	-4.036	16.293	4.036
350	30.8	99.983	8.979	8.978	21.822	476.201	21.822
351	7.3	101.792	24.850	25.295	-17.995	323.830	17.995
352	178.7	102.167	69.376	70.879	107.821	11625.328	107.821
353	286.4	102.133	219.499	224.182	62.218	3871.096	62.218
354	101.2	99.733	102.595	102.321	-1.121	1.257	1.121
355	19.4	103.117	90.715	93.543	-74.143	5497.115	74.143
356	150.2	101.725	129.225	131.454	18.746	351.424	18.746
357	247.6	105.508	253.324	267.278	-19.678	387.237	19.678
358	324.8	111.258	233.531	259.823	64.977	4222.062	64.977
359	7.4	116.292	56.307	65.481	-58.081	3373.350	58.081
360	0	113.350	7.564	8.574	-8.574	73.509	8.574
361	0	112.817	4.034	4.551	-4.551	20.712	4.551
362	0	112.817	8.979	10.130	-10.130	102.624	10.130
363	193.8	110.250	24.850	27.397	166.403	27689.895	166.403
364	0	125.792	69.376	87.269	-87.269	7615.926	87.269
365	398.7	110.900	219.499	243.425	155.275	24110.441	155.275
366	30.2	120.258	102.595	123.379	-93.179	8682.311	93.179
367	48.8	114.342	90.715	103.725	-54.925	3016.791	54.925
368	53.8	116.792	129.225	150.924	-97.124	9432.980	97.124
369	150.1	108.758	253.324	275.511	-125.411	15728.015	125.411
370	290.3	100.633	233.531	235.010	55.290	3056.990	55.290
371	22.9	97.758	56.307	55.045	-32.145	1033.298	32.145
372	12.3	99.050	7.564	7.492	4.808	23.116	4.808
รวม						1444186.599	15227.889

3.1.2 วิธีการทำให้เรียบแบบเอกซ์โพเนนเชียล (Single Exponential Smoothing)

1) ค่าแนวโน้ม (T) จากที่กล่าวไว้ในบทที่ 2 (2.2.2.1) วิธีการทำให้เรียบแบบเอกซ์โพเนนเชียลนี้จะต้องกำหนดค่า θ เพื่อใช้ในการวิเคราะห์หาค่าแนวโน้ม ซึ่งในการวิเคราะห์ได้ทำการกำหนดค่า θ ตั้งแต่ 0.0001 – 0.9999 ปรากฏว่าค่า θ ที่ทำให้ค่าคลาดเคลื่อนกำลังสองมีค่าน้อยที่สุดคือ $\theta = 0.9553$ การคำนวณค่าแนวโน้มแสดงดังตาราง 3.4

ตาราง 3.4 แสดงการหาค่าแนวโน้มโดยวิธีการทำให้เรียบแบบเอกซ์โพเนนเชียล $\theta = 0.9553$

เดือน	ข้อมูล Y	$S_t^{(1)}$	a_t	ค่าแนวโน้ม T	Y/T = SCI
1	0	0.000	0.000	*	*
2	0	0.000	0.000	0.000	*
3	13.7	0.612	0.612	0.000	*
4	14.1	1.215	1.215	0.612	2302.454
5	222.7	11.116	11.116	1.215	18324.902
6	55.6	13.104	13.104	11.116	500.196
7	101.4	17.051	17.051	13.104	773.803
8	194.9	25.001	25.001	17.051	1143.046
9	182.1	32.023	32.023	25.001	728.377
10	210.6	40.006	40.006	32.023	657.650
11	20.4	39.129	39.129	40.006	50.993
12	18.2	38.194	38.194	39.129	46.513
13	0.7	36.518	36.518	38.194	1.833
14	3.1	35.024	35.024	36.518	8.489
15	7.3	33.785	33.785	35.024	20.843
16	74.7	35.614	35.614	33.785	221.107
17	112.3	39.041	39.041	35.614	315.330
18	73.9	40.600	40.600	39.041	189.286
19	68.8	41.860	41.860	40.600	169.460
20	47.4	42.108	42.108	41.860	113.234
21	380.5	57.234	57.234	42.108	903.633
22	208.9	64.013	64.013	57.234	364.993
23	107.4	65.953	65.953	64.013	167.777
24	29.8	64.337	64.337	65.953	45.184
25	0	61.461	61.461	64.337	0.000
26	0	58.714	58.714	61.461	0.000
27	123.6	61.614	61.614	58.714	210.513

ตาราง 3.4 (ต่อ)

เดือน	ข้อมูล Y	$S_t^{(1)}$	a_0	ค่าแนวโน้ม T	Y/T = SCI
28	0	58.860	58.860	61.614	0.000
29	336.4	71.266	71.266	58.860	571.527
30	140.3	74.352	74.352	71.266	196.868
31	38.7	72.758	72.758	74.352	52.050
32	119.1	74.830	74.830	72.758	163.693
33	347.9	87.036	87.036	74.830	464.923
34	243	94.007	94.007	87.036	279.195
35	7.6	90.145	90.145	94.007	8.084
36	0	86.116	86.116	90.145	0.000
37	0	82.266	82.266	86.116	0.000
38	0	78.589	78.589	82.266	0.000
39	64.3	77.950	77.950	78.589	81.818
40	123.3	79.977	79.977	77.950	158.178
41	267.8	88.373	88.373	79.977	334.845
42	50.6	86.685	86.685	88.373	57.257
43	90.9	86.873	86.873	86.685	104.863
44	131	88.845	88.845	86.873	150.795
45	267.7	96.840	96.840	88.845	301.310
46	299.1	105.881	105.881	96.840	308.859
47	170.2	108.756	108.756	105.881	160.746
48	3.9	104.069	104.069	108.756	3.586
49	76.6	102.841	102.841	104.069	73.605
50	0	98.244	98.244	102.841	0.000
51	0	93.853	93.853	98.244	0.000
52	3.3	89.805	89.805	93.853	3.516
53	199.3	94.700	94.700	89.805	221.925
54	107.1	95.254	95.254	94.700	113.095
55	64.4	93.875	93.875	95.254	67.609
56	87.8	93.603	93.603	93.875	93.529
57	192.4	98.019	98.019	93.603	205.549
58	276.8	106.011	106.011	98.019	282.393
59	85.1	105.076	105.076	106.011	80.275
60	33.7	101.886	101.886	105.076	32.072

ตาราง 3.4 (ต่อ)

เดือน	ข้อมูล Y	$S_t^{(1)}$	a_0	ค่าแนวโน้ม T	Y/T = SCI
61	0	97.331	97.331	101.886	0.000
62	0.3	92.994	92.994	97.331	0.308
63	4.3	89.029	89.029	92.994	4.624
64	20.9	85.984	85.984	89.029	23.475
65	166.1	89.565	89.565	85.984	193.175
66	85.4	89.379	89.379	89.565	95.350
67	132.4	91.302	91.302	89.379	148.133
68	169.5	94.798	94.798	91.302	185.648
69	234.1	101.024	101.024	94.798	246.947
70	280.1	109.029	109.029	101.024	277.260
71	43.7	106.109	106.109	109.029	40.081
72	30.7	102.738	102.738	106.109	28.933
73	35.9	99.750	99.750	102.738	34.943
74	0	95.292	95.292	99.750	0.000
75	46.5	93.111	93.111	95.292	48.798
76	58.2	91.550	91.550	93.111	62.506
77	103.8	92.098	92.098	91.550	113.381
78	19.6	88.857	88.857	92.098	21.282
79	108.8	89.748	89.748	88.857	122.444
80	60.7	88.450	88.450	89.748	67.633
81	213.5	94.040	94.040	88.450	241.379
82	140.5	96.116	96.116	94.040	149.405
83	15.6	92.517	92.517	96.116	16.230
84	0.8	88.418	88.418	92.517	0.865
85	7.8	84.814	84.814	88.418	8.822
86	23.9	82.091	82.091	84.814	28.179
87	0	78.422	78.422	82.091	0.000
88	8.6	75.301	75.301	78.422	10.966
89	273.7	84.169	84.169	75.301	363.476
90	53.8	82.812	82.812	84.169	63.919
91	272.2	91.277	91.277	82.812	328.698
92	40.4	89.003	89.003	91.277	44.261

ตาราง 3.4 (ต่อ)

เดือน	ข้อมูล Y	$S_t^{(1)}$	a_0	ค่าแนวโน้ม T	Y/T = SCI
93	248	96.110	96.110	89.003	278.642
94	108.9	96.682	96.682	96.110	113.307
95	0	92.360	92.360	96.682	0.000
96	0	88.232	88.232	92.360	0.000
97	0	84.288	84.288	88.232	0.000
98	0	80.520	80.520	84.288	0.000
99	0	76.921	76.921	80.520	0.000
100	39.4	75.244	75.244	76.921	51.221
101	156.5	78.876	78.876	75.244	207.991
102	111.6	80.339	80.339	78.876	141.488
103	44.8	78.750	78.750	80.339	55.764
104	89.8	79.244	79.244	78.750	114.032
105	362.1	91.888	91.888	79.244	456.943
106	33.6	89.282	89.282	91.888	36.566
107	0	85.291	85.291	89.282	0.000
108	0	81.479	81.479	85.291	0.000
109	0	77.837	77.837	81.479	0.000
110	0	74.357	74.357	77.837	0.000
111	37.2	72.696	72.696	74.357	50.029
112	19.1	70.301	70.301	72.696	26.274
113	277.7	79.571	79.571	70.301	395.018
114	52.2	78.348	78.348	79.571	65.601
115	66.1	77.800	77.800	78.348	84.367
116	156	81.296	81.296	77.800	200.513
117	297.9	90.978	90.978	81.296	366.439
118	185.7	95.212	95.212	90.978	204.115
119	71.1	94.134	94.134	95.212	74.675
120	0	89.927	89.927	94.134	0.000
121	0	85.907	85.907	89.927	0.000
122	0.05	82.069	82.069	85.907	0.058
123	0.3	78.414	78.414	82.069	0.366
124	123.1	80.411	80.411	78.414	156.987

ตาราง 3.4 (ต่อ)

เดือน	ข้อมูล Y	$S_t^{(1)}$	a_0	ค่าแนวโน้ม T	Y/T = SCI
125	234.7	87.308	87.308	80.411	291.874
126	77.4	86.865	86.865	87.308	88.652
127	72.7	86.232	86.232	86.865	83.693
128	78.8	85.900	85.900	86.232	91.381
129	90.6	86.110	86.110	85.900	105.472
130	112	87.267	87.267	86.110	130.066
131	217.2	93.075	93.075	87.267	248.891
132	0	88.915	88.915	93.075	0.000
133	0.05	84.943	84.943	88.915	0.056
134	0	81.146	81.146	84.943	0.000
135	2.6	77.635	77.635	81.146	3.204
136	28.6	75.443	75.443	77.635	36.839
137	197.4	80.894	80.894	75.443	261.655
138	91.4	81.364	81.364	80.894	112.987
139	38.9	79.466	79.466	81.364	47.810
140	62.3	78.698	78.698	79.466	78.399
141	113.2	80.241	80.241	78.698	143.840
142	182.4	84.807	84.807	80.241	227.316
143	18.6	81.848	81.848	84.807	21.932
144	0	78.189	78.189	81.848	0.000
145	0.4	74.712	74.712	78.189	0.512
146	0	71.372	71.372	74.712	0.000
147	0.05	68.184	68.184	71.372	0.070
148	0.6	65.163	65.163	68.184	0.880
149	175.2	70.082	70.082	65.163	268.863
150	98.9	71.370	71.370	70.082	141.121
151	59.7	70.848	70.848	71.370	83.649
152	188.9	76.125	76.125	70.848	266.626
153	169	80.277	80.277	76.125	222.003
154	289	89.607	89.607	80.277	360.005
155	214	95.167	95.167	89.607	238.821
156	14.1	91.543	91.543	95.167	14.816

ตาราง 3.4 (ต่อ)

เดือน	ข้อมูล Y	$S_t^{(1)}$	a_0	ค่าแนวโน้ม T	Y/T = SCI
157	0.05	87.454	87.454	91.543	0.055
158	21.7	84.514	84.514	87.454	24.813
159	0	80.737	80.737	84.514	0.000
160	43.2	79.059	79.059	80.737	53.507
161	116.4	80.728	80.728	79.059	147.232
162	106.8	81.893	81.893	80.728	132.296
163	60.9	80.955	80.955	81.893	74.365
164	71.7	80.541	80.541	80.955	88.568
165	214.6	86.534	86.534	80.541	266.447
166	248.7	93.782	93.782	86.534	287.403
167	2.6	89.707	89.707	93.782	2.772
168	0	85.697	85.697	89.707	0.000
169	0	81.866	81.866	85.697	0.000
170	0	78.207	78.207	81.866	0.000
171	0.8	74.747	74.747	78.207	1.023
172	40.4	73.211	73.211	74.747	54.049
173	148.4	76.572	76.572	73.211	202.701
174	59.9	75.827	75.827	76.572	78.227
175	61.5	75.187	75.187	75.827	81.106
176	37.7	73.511	73.511	75.187	50.142
177	307.3	83.961	83.961	73.511	418.033
178	194.2	88.889	88.889	83.961	231.297
179	118.2	90.199	90.199	88.889	132.975
180	0	86.167	86.167	90.199	0.000
181	0	82.316	82.316	86.167	0.000
182	0	78.636	78.636	82.316	0.000
183	0.05	75.123	75.123	78.636	0.064
184	35	73.330	73.330	75.123	46.590
185	196.3	78.827	78.827	73.330	267.695
186	57.7	77.882	77.882	78.827	73.199
187	21.8	75.375	75.375	77.882	27.991
188	120.3	77.383	77.383	75.375	159.601

ตาราง 3.4 (ต่อ)

เดือน	ข้อมูล Y	$S_t^{(1)}$	a_0	ค่าแนวโน้ม T	Y/T = SCI
189	228.6	84.143	84.143	77.383	295.412
190	128.8	86.139	86.139	84.143	153.073
191	0.2	82.298	82.298	86.139	0.232
192	6.1	78.892	78.892	82.298	7.412
193	0	75.365	75.365	78.892	0.000
194	0	71.996	71.996	75.365	0.000
195	26.4	69.958	69.958	71.996	36.669
196	72.6	70.076	70.076	69.958	103.776
197	73.3	70.220	70.220	70.076	104.600
198	169.6	74.663	74.663	70.220	241.526
199	15.6	72.022	72.022	74.663	20.894
200	256.5	80.269	80.269	72.022	356.139
201	229.4	86.935	86.935	80.269	285.790
202	139.5	89.284	89.284	86.935	160.465
203	89.5	89.294	89.294	89.284	100.241
204	0	85.303	85.303	89.294	0.000
205	0	81.490	81.490	85.303	0.000
206	0.1	77.851	77.851	81.490	0.123
207	0	74.372	74.372	77.851	0.000
208	69.8	74.167	74.167	74.372	93.853
209	168.5	78.384	78.384	74.167	227.189
210	244.3	85.800	85.800	78.384	311.671
211	180.3	90.024	90.024	85.800	210.139
212	68.4	89.058	89.058	90.024	75.979
213	183.2	93.266	93.266	89.058	205.709
214	414.1	107.607	107.607	93.266	443.999
215	46.4	104.871	104.871	107.607	43.120
216	0	100.184	100.184	104.871	0.000
217	0.7	95.737	95.737	100.184	0.699
218	10.4	91.922	91.922	95.737	10.863
219	36.7	89.454	89.454	91.922	39.925
220	0.05	85.457	85.457	89.454	0.056

ตาราง 3.4 (ต่อ)

เดือน	ข้อมูล Y	$S_t^{(1)}$	a_0	ค่าแนวโน้ม T	Y/T = SCI
221	133	87.582	87.582	85.457	155.633
222	80.7	87.275	87.275	87.582	92.142
223	59.4	86.029	86.029	87.275	68.061
224	29.6	83.506	83.506	86.029	34.407
225	76.4	83.189	83.189	83.506	91.490
226	360.9	95.602	95.602	83.189	433.832
227	5.7	91.584	91.584	95.602	5.962
228	0	87.490	87.490	91.584	0.000
229	0.05	83.581	83.581	87.490	0.057
230	0	79.845	79.845	83.581	0.000
231	2	76.366	76.366	79.845	2.505
232	89.8	76.966	76.966	76.366	117.592
233	221.8	83.440	83.440	76.966	288.178
234	28.5	80.984	80.984	83.440	34.156
235	19	78.214	78.214	80.984	23.461
236	74	78.025	78.025	78.214	94.613
237	175.8	82.396	82.396	78.025	225.311
238	297.5	92.011	92.011	82.396	361.062
239	19.8	88.783	88.783	92.011	21.519
240	0	84.815	84.815	88.783	0.000
241	0.5	81.046	81.046	84.815	0.590
242	0	77.423	77.423	81.046	0.000
243	2.4	74.069	74.069	77.423	3.100
244	54.3	73.186	73.186	74.069	73.310
245	40.7	71.734	71.734	73.186	55.612
246	149.9	75.228	75.228	71.734	208.967
247	57.6	74.440	74.440	75.228	76.568
248	160.3	78.278	78.278	74.440	215.342
249	94.6	79.007	79.007	78.278	120.852
250	316.4	89.619	89.619	79.007	400.469
251	15.8	86.319	86.319	89.619	17.630
252	5.7	82.715	82.715	86.319	6.603

ตาราง 3.4 (ต่อ)

เดือน	ข้อมูล Y	$S_t^{(1)}$	a_0	ค่าแนวโน้ม T	Y/T = SCI
253	7.5	79.353	79.353	82.715	9.067
254	90.9	79.869	79.869	79.353	114.551
255	0	76.299	76.299	79.869	0.000
256	22.7	73.903	73.903	76.299	29.751
257	6.6	70.895	70.895	73.903	8.931
258	75.7	71.110	71.110	70.895	106.778
259	202.1	76.965	76.965	71.110	284.209
260	111.1	78.491	78.491	76.965	144.351
261	234.4	85.460	85.460	78.491	298.634
262	230.8	91.957	91.957	85.460	270.068
263	1.4	87.909	87.909	91.957	1.522
264	63.7	86.827	86.827	87.909	72.462
265	0	82.945	82.945	86.827	0.000
266	0	79.238	79.238	82.945	0.000
267	22.9	76.720	76.720	79.238	28.900
268	119.4	78.627	78.627	76.720	155.632
269	133.5	81.080	81.080	78.627	169.788
270	5.7	77.711	77.711	81.080	7.030
271	49.6	76.454	76.454	77.711	63.827
272	71.1	76.215	76.215	76.454	92.997
273	213.3	82.342	82.342	76.215	279.867
274	152.5	85.479	85.479	82.342	185.202
275	0	81.658	81.658	85.479	0.000
276	0	78.008	78.008	81.658	0.000
277	0	74.521	74.521	78.008	0.000
278	0	71.190	71.190	74.521	0.000
279	36.8	69.652	69.652	71.190	51.693
280	74.2	69.856	69.856	69.652	106.529
281	363.1	82.964	82.964	69.856	519.787
282	105.2	83.958	83.958	82.964	126.803
283	71.1	83.383	83.383	83.958	84.686
284	134.1	85.650	85.650	83.383	160.824

ตาราง 3.4 (ต่อ)

เดือน	ข้อมูล Y	$S_t^{(1)}$	a_0	ค่าแนวโน้ม T	Y/T = SCI
285	34.6	83.368	83.368	85.650	40.397
286	118.8	84.952	84.952	83.368	142.501
287	6.4	81.441	81.441	84.952	7.534
288	0	77.800	77.800	81.441	0.000
289	0.05	74.325	74.325	77.800	0.064
290	0	71.002	71.002	74.325	0.000
291	15.8	68.535	68.535	71.002	22.253
292	61.3	68.211	68.211	68.535	89.444
293	177.2	73.083	73.083	68.211	259.780
294	55.5	72.297	72.297	73.083	75.941
295	76.1	72.467	72.467	72.297	105.260
296	117.2	74.467	74.467	72.467	161.728
297	234.5	81.620	81.620	74.467	314.905
298	105.3	82.679	82.679	81.620	129.012
299	28.2	80.244	80.244	82.679	34.108
300	0	76.657	76.657	80.244	0.000
301	0	73.230	73.230	76.657	0.000
302	30.6	71.325	71.325	73.230	41.786
303	44	70.103	70.103	71.325	61.690
304	155.6	73.925	73.925	70.103	221.959
305	228.5	80.834	80.834	73.925	309.098
306	250.2	88.405	88.405	80.834	309.522
307	138.6	90.649	90.649	88.405	156.778
308	167.1	94.066	94.066	90.649	184.338
309	375.9	106.664	106.664	94.066	399.613
310	81.2	105.526	105.526	106.664	76.127
311	77.2	104.260	104.260	105.526	73.157
312	0.05	99.601	99.601	104.260	0.048
313	0	95.149	95.149	99.601	0.000
314	0	90.896	90.896	95.149	0.000
315	44.3	88.813	88.813	90.896	48.737
316	74.9	88.191	88.191	88.813	84.334
317	65.4	87.173	87.173	88.191	74.157

ตาราง 3.4 (ต่อ)

เดือน	ข้อมูล Y	$S_t^{(1)}$	a_0	ค่าแนวโน้ม T	Y/T = SCI
318	17.5	84.058	84.058	87.173	20.075
319	90.9	84.364	84.364	84.058	108.139
320	221.5	90.494	90.494	84.364	262.553
321	204.2	95.577	95.577	90.494	225.650
322	63.6	94.147	94.147	95.577	66.543
323	17.3	90.712	90.712	94.147	18.375
324	0	86.657	86.657	90.712	0.000
325	0	82.784	82.784	86.657	0.000
326	0	79.083	79.083	82.784	0.000
327	0	75.548	75.548	79.083	0.000
328	0.05	72.174	72.174	75.548	0.066
329	90.1	72.975	72.975	72.174	124.838
330	56.1	72.221	72.221	72.975	76.876
331	84.1	72.752	72.752	72.221	116.449
332	110.8	74.452	74.452	72.752	152.299
333	225.2	81.191	81.191	74.452	302.475
334	153.2	84.410	84.410	81.191	188.691
335	42.1	82.518	82.518	84.410	49.876
336	1.9	78.915	78.915	82.518	2.303
337	0.9	75.427	75.427	78.915	1.140
338	9.1	72.463	72.463	75.427	12.065
339	2.8	69.349	69.349	72.463	3.864
340	179.1	74.255	74.255	69.349	258.260
341	315.2	85.025	85.025	74.255	424.486
342	60.6	83.933	83.933	85.025	71.273
343	36.1	81.795	81.795	83.933	43.010
344	104.8	82.823	82.823	81.795	128.125
345	178.6	87.104	87.104	82.823	215.640
346	264.4	95.030	95.030	87.104	303.544
347	42.7	92.690	92.690	95.030	44.933
348	6.4	88.833	88.833	92.690	6.905
349	0	84.862	84.862	88.833	0.000
350	30.8	82.446	82.446	84.862	36.294

ตาราง 3.4 (ต่อ)

เดือน	ข้อมูล Y	$S_t^{(1)}$	a_0	ค่าแนวโน้ม T	Y/T = SCI
351	7.3	79.087	79.087	82.446	8.854
352	178.7	83.540	83.540	79.087	225.954
353	286.4	92.607	92.607	83.540	342.832
354	101.2	92.991	92.991	92.607	109.279
355	19.4	89.702	89.702	92.991	20.862
356	150.2	92.406	92.406	89.702	167.443
357	247.6	99.343	99.343	92.406	267.947
358	324.8	109.421	109.421	99.343	326.947
359	7.4	104.861	104.861	109.421	6.763
360	0	100.174	100.174	104.861	0.000
361	0	95.696	95.696	100.174	0.000
362	0	91.418	91.418	95.696	0.000
363	193.8	95.995	95.995	91.418	211.993
364	0	91.704	91.704	95.995	0.000
365	398.7	105.426	105.426	91.704	434.769
366	30.2	102.064	102.064	105.426	28.646
367	48.8	99.683	99.683	102.064	47.813
368	53.8	97.632	97.632	99.683	53.971
369	150.1	99.977	99.977	97.632	153.741
370	290.3	108.485	108.485	99.977	290.366
371	22.9	104.659	104.659	108.485	21.109
372	12.3	100.531	100.531	104.659	11.752

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2) ดัชนีฤดูกาล (Seasonal Index) ในการคำนวณค่าดัชนีฤดูกาลจะใช้วิธีอัตราส่วนต่อค่าแนวโน้ม จากการหาค่าแนวโน้มโดยวิธีการทำให้เรียบแบบเอ็กซ์โพเนนเชียล ที่ $\theta = 0.9553$ ดังตาราง 3.4 เมื่อทำการขจัดค่าแนวโน้มโดยการหารข้อมูลจริงด้วยค่าแนวโน้ม (Y/T) จะได้ค่า SCI และใช้ SCI นี้ไปหาดัชนีฤดูกาล ดังตาราง 3.5

ตาราง 3.5 แสดงค่าดัชนีฤดูกาล

ปี	เดือน											
	ม.ค.	ก.พ.	มี.ค.	เม.ย.	พ.ค.	มิ.ย.	ก.ค.	ส.ค.	ก.ย.	ต.ค.	พ.ย.	ธ.ค.
2514	*	*	*	2302.454	18324.902	500.196	773.803	1143.046	728.377	657.650	50.993	46.513
2515	1.833	8.489	20.843	221.107	315.330	189.286	169.460	113.234	903.633	364.993	167.777	45.184
2516	0.000	0.000	210.513	0.000	571.527	196.868	52.050	163.693	464.923	279.195	8.084	0.000
2517	0.000	0.000	81.818	158.178	334.845	57.257	104.863	150.795	301.310	308.859	160.746	3.586
2518	73.605	0.000	0.000	3.516	221.925	113.095	67.609	93.529	205.549	282.393	80.275	32.072
2519	0.000	0.308	4.624	23.475	193.175	95.350	148.133	185.648	246.947	277.260	40.081	28.933
2520	34.943	0.000	48.798	62.506	113.381	21.282	122.444	67.633	241.379	149.405	16.230	0.865
2521	8.822	28.179	0.000	10.966	363.476	63.919	328.698	44.261	278.642	113.307	0.000	0.000
2522	0.000	0.000	0.000	51.221	207.991	141.488	55.764	114.032	456.943	36.566	0.000	0.000
2523	0.000	0.000	50.029	26.274	395.018	65.601	84.367	200.513	366.439	204.115	74.675	0.000
2524	0.000	0.058	0.366	156.987	291.874	88.652	83.693	91.381	105.472	130.066	248.891	0.000
2525	0.056	0.000	3.204	36.839	261.655	112.987	47.810	78.399	143.840	227.316	21.932	0.000
2526	0.512	0.000	0.070	0.880	268.863	141.121	83.649	266.626	222.003	360.005	238.821	14.816
2527	0.055	24.813	0.000	53.507	147.232	132.296	74.365	88.568	266.447	287.403	2.772	0.000
2528	0.000	0.000	1.023	54.049	202.701	78.227	81.106	50.142	418.033	231.297	132.975	0.000
2529	0.000	0.000	0.064	46.590	267.695	73.199	27.991	159.601	295.412	153.073	0.232	7.412
2530	0.000	0.000	36.669	103.776	104.600	241.526	20.894	356.139	285.790	160.465	100.241	0.000
2531	0.000	0.123	0.000	93.853	227.189	311.671	210.139	75.979	205.709	443.999	43.120	0.000
2532	0.699	10.863	39.925	0.056	155.633	92.142	68.061	34.407	91.490	433.832	5.962	0.000
2533	0.057	0.000	2.505	117.592	288.178	34.156	23.461	94.613	225.311	361.062	21.519	0.000
2534	0.590	0.000	3.100	73.310	55.612	208.967	76.568	215.342	120.852	400.469	17.630	6.603
2535	9.067	114.551	0.000	29.751	8.931	106.778	284.209	144.351	298.634	270.068	1.522	72.462
2536	0.000	0.000	28.900	155.632	169.788	7.030	63.827	92.997	279.867	185.202	0.000	0.000
2537	0.000	0.000	51.693	106.529	519.787	126.803	84.686	160.824	40.397	142.501	7.534	0.000
2538	0.064	0.000	22.253	89.444	259.780	75.941	105.260	161.728	314.905	129.012	34.108	0.000
2539	0.000	41.786	61.690	221.959	309.098	309.522	156.778	184.338	399.613	76.127	73.157	0.048
2540	0.000	0.000	48.737	84.334	74.157	20.075	108.139	262.553	225.650	66.543	18.375	0.000
2541	0.000	0.000	0.000	0.066	124.838	76.876	116.449	152.299	302.475	188.691	49.876	2.303
2542	1.140	12.065	3.864	258.260	424.486	71.273	43.010	128.125	215.640	303.544	44.933	6.905
2543	0.000	36.294	8.854	225.954	342.832	109.279	20.862	167.443	267.947	326.947	6.763	0.000
2544	0.000	0.000	211.993	0.000	434.769	28.646	47.813	53.971	153.741	290.366	21.109	11.752
รวม	131.442	277.530	941.533	4769.068	25981.269	3891.506	3735.960	5296.211	9073.372	7841.733	1690.337	279.452
ค่าเฉลี่ย	4.381	9.251	31.384	153.841	838.105	125.532	120.515	170.846	292.689	252.959	54.527	9.015
S	2.549	5.381	18.255	89.484	487.496	73.018	70.099	99.375	170.247	147.137	31.716	5.243

จากตาราง 3.5 พบว่าเมื่อนำค่าดัชนีฤดูกาลของทุกเดือนมารวมกันจะได้เท่ากับ 1,200 เพราะเป็นค่าดัชนีฤดูกาลที่ปรับแล้ว (normalized seasonal index) เนื่องจากเรากำหนดค่าดัชนีฤดูกาลในรูปแบบเปอร์เซ็นต์ นั่นหมายถึง ถ้าปริมาณน้ำฝนในเดือนใดมีค่าดัชนีฤดูกาลเท่ากับ 100 แสดงว่าไม่มีอิทธิพลของฤดูกาลต่อปริมาณน้ำฝน แต่ถ้าค่าดัชนีฤดูกาลในเดือนใดมีค่ามากกว่า 100 แสดงว่าอิทธิพลของฤดูกาลต่อปริมาณน้ำฝนในเดือนนั้นสูงกว่าปริมาณน้ำฝนเฉลี่ย และถ้าค่าดัชนีฤดูกาลใดมีค่าน้อยกว่า 100 แสดงว่าอิทธิพลของฤดูกาลในเดือนนั้นทำให้ปริมาณน้ำฝนต่ำกว่าปริมาณน้ำฝนเฉลี่ย

3) การพยากรณ์

จากรูปแบบของการพยากรณ์คือ $\hat{Y} = T \times S$ เมื่อได้ส่วนของค่าแนวโน้ม (T) และดัชนีฤดูกาล (S) แล้วทำการหาค่าพยากรณ์ และ ค่าความคลาดเคลื่อน ดังแสดงในตาราง 3.6 ซึ่งวิธีการทำให้เรียบแบบเอ็กซ์โพเนนเชียล ที่ $\theta = 0.9553$ นี้ คำนวณค่า MSE และ MAD ได้

$$MSE = 8,030.161 \quad MAD = 55.309$$

ตาราง 3.6 แสดงการพยากรณ์อนุกรมเวลาโดยวิธีการทำให้เรียบแบบเอ็กซ์โพเนนเชียล $\theta = 0.9553$

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
1	0	*	*	*	*	*	*
2	0	0.000	5.381	0.000	0.000	0.000	0.000
3	13.7	0.000	18.255	0.000	13.700	187.690	13.700
4	14.1	0.612	89.484	0.548	13.552	183.657	13.552
5	222.7	1.215	487.496	5.924	216.776	46991.630	216.776
6	55.6	11.116	73.018	8.116	47.484	2254.692	47.484
7	101.4	13.104	70.099	9.186	92.214	8503.446	92.214
8	194.9	17.051	99.375	16.944	177.956	31668.227	177.956
9	182.1	25.001	170.247	42.563	139.537	19470.555	139.537
10	210.6	32.023	147.137	47.118	163.482	26726.385	163.482
11	20.4	40.006	31.716	12.688	7.712	59.470	7.712
12	18.2	39.129	5.243	2.052	16.148	260.767	16.148
13	0.7	38.194	2.549	0.973	-0.273	0.075	0.273
14	3.1	36.518	5.381	1.965	1.135	1.288	1.135
15	7.3	35.024	18.255	6.394	0.906	0.821	0.906
16	74.7	33.785	89.484	30.232	44.468	1977.427	44.468
17	112.3	35.614	487.496	173.615	-61.315	3759.470	61.315

ตาราง 3.6 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
18	73.9	39.041	73.018	28.507	45.393	2060.510	45.393
19	68.8	40.600	70.099	28.460	40.340	1627.317	40.340
20	47.4	41.860	99.375	41.598	5.802	33.658	5.802
21	380.5	42.108	170.247	71.687	308.813	95365.333	308.813
22	208.9	57.234	147.137	84.212	124.688	15546.993	124.688
23	107.4	64.013	31.716	20.303	87.097	7585.932	87.097
24	29.8	65.953	5.243	3.458	26.342	693.890	26.342
25	0	64.337	2.549	1.640	-1.640	2.688	1.640
26	0	61.461	5.381	3.307	-3.307	10.938	3.307
27	123.6	58.714	18.255	10.718	112.882	12742.281	112.882
28	0	61.614	89.484	55.135	-55.135	3039.815	55.135
29	336.4	58.860	487.496	286.939	49.461	2446.348	49.461
30	140.3	71.266	73.018	52.037	88.263	7790.401	88.263
31	38.7	74.352	70.099	52.120	-13.420	180.095	13.420
32	119.1	72.758	99.375	72.303	46.797	2189.945	46.797
33	347.9	74.830	170.247	127.395	220.505	48622.419	220.505
34	243	87.036	147.137	128.062	114.938	13210.713	114.938
35	7.6	94.007	31.716	29.816	-22.216	493.541	22.216
36	0	90.145	5.243	4.727	-4.727	22.342	4.727
37	0	86.116	2.549	2.195	-2.195	4.817	2.195
38	0	82.266	5.381	4.427	-4.427	19.596	4.427
39	64.3	78.589	18.255	14.347	49.953	2495.346	49.953
40	123.3	77.950	89.484	69.753	53.547	2867.312	53.547
41	267.8	79.977	487.496	389.886	-122.086	14905.004	122.086
42	50.6	88.373	73.018	64.528	-13.928	193.988	13.928
43	90.9	86.685	70.099	60.765	30.135	908.110	30.135
44	131	86.873	99.375	86.330	44.670	1995.431	44.670
45	267.7	88.845	170.247	151.257	116.443	13559.057	116.443
46	299.1	96.840	147.137	142.488	156.612	24527.300	156.612
47	170.2	105.881	31.716	33.582	136.618	18664.555	136.618
48	3.9	108.756	5.243	5.703	-1.803	3.249	1.803
49	76.6	104.069	2.549	2.652	73.948	5468.275	73.948
50	0	102.841	5.381	5.534	-5.534	30.624	5.534
51	0	98.244	18.255	17.935	-17.935	321.654	17.935
52	3.3	93.853	89.484	83.983	-80.683	6509.746	80.683
53	199.3	89.805	487.496	437.796	-238.496	56880.430	238.496

ตาราง 3.6 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
54	107.1	94.700	73.018	69.147	37.953	1440.396	37.953
55	64.4	95.254	70.099	66.772	-2.372	5.627	2.372
56	87.8	93.875	99.375	93.288	-5.488	30.115	5.488
57	192.4	93.603	170.247	159.356	33.044	1091.876	33.044
58	276.8	98.019	147.137	144.223	132.577	17576.669	132.577
59	85.1	106.011	31.716	33.623	51.477	2649.900	51.477
60	33.7	105.076	5.243	5.510	28.190	794.697	28.190
61	0	101.886	2.549	2.597	-2.597	6.742	2.597
62	0.3	97.331	5.381	5.237	-4.937	24.378	4.937
63	4.3	92.994	18.255	16.976	-12.676	160.687	12.676
64	20.9	89.029	89.484	79.667	-58.767	3453.540	58.767
65	166.1	85.984	487.496	419.169	-253.069	64043.692	253.069
66	85.4	89.565	73.018	65.398	20.002	400.061	20.002
67	132.4	89.379	70.099	62.654	69.746	4864.512	69.746
68	169.5	91.302	99.375	90.731	78.769	6204.531	78.769
69	234.1	94.798	170.247	161.390	72.710	5286.766	72.710
70	280.1	101.024	147.137	148.644	131.456	17280.570	131.456
71	43.7	109.029	31.716	34.580	9.120	83.173	9.120
72	30.7	106.109	5.243	5.564	25.136	631.830	25.136
73	35.9	102.738	2.549	2.618	33.282	1107.672	33.282
74	0	99.750	5.381	5.368	-5.368	28.810	5.368
75	46.5	95.292	18.255	17.396	29.104	847.062	29.104
76	58.2	93.111	89.484	83.319	-25.119	630.954	25.119
77	103.8	91.550	487.496	446.303	-342.503	117308.102	342.503
78	19.6	92.098	73.018	67.248	-47.648	2270.293	47.648
79	108.8	88.857	70.099	62.288	46.512	2163.366	46.512
80	60.7	89.748	99.375	89.187	-28.487	811.523	28.487
81	213.5	88.450	170.247	150.583	62.917	3958.504	62.917
82	140.5	94.040	147.137	138.367	2.133	4.548	2.133
83	15.6	96.116	31.716	30.485	-14.885	221.554	14.885
84	0.8	92.517	5.243	4.851	-4.051	16.412	4.051
85	7.8	88.418	2.549	2.253	5.547	30.766	5.547
86	23.9	84.814	5.381	4.564	19.336	373.888	19.336
87	0	82.091	18.255	14.986	-14.986	224.578	14.986
88	8.6	78.422	89.484	70.175	-61.575	3791.437	61.575
89	273.7	75.301	487.496	367.088	-93.388	8721.242	93.388

ตาราง 3.6 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
90	53.8	84.169	73.018	61.458	-7.658	58.651	7.658
91	272.2	82.812	70.099	58.050	214.150	45860.117	214.150
92	40.4	91.277	99.375	90.707	-50.307	2530.746	50.307
93	248	89.003	170.247	151.525	96.475	9307.430	96.475
94	108.9	96.110	147.137	141.414	-32.514	1057.156	32.514
95	0	96.682	31.716	30.664	-30.664	940.282	30.664
96	0	92.360	5.243	4.843	-4.843	23.453	4.843
97	0	88.232	2.549	2.249	-2.249	5.056	2.249
98	0	84.288	5.381	4.535	-4.535	20.571	4.535
99	0	80.520	18.255	14.699	-14.699	216.064	14.699
100	39.4	76.921	89.484	68.832	-29.432	866.223	29.432
101	156.5	75.244	487.496	366.810	-210.310	44230.236	210.310
102	111.6	78.876	73.018	57.593	54.007	2916.718	54.007
103	44.8	80.339	70.099	56.317	-11.517	132.634	11.517
104	89.8	78.750	99.375	78.258	11.542	133.227	11.542
105	362.1	79.244	170.247	134.910	227.190	51615.101	227.190
106	33.6	91.888	147.137	135.201	-101.601	10322.751	101.601
107	0	89.282	31.716	28.317	-28.317	801.858	28.317
108	0	85.291	5.243	4.472	-4.472	20.001	4.472
109	0	81.479	2.549	2.076	-2.076	4.312	2.076
110	0	77.837	5.381	4.188	-4.188	17.542	4.188
111	37.2	74.357	18.255	13.574	23.626	558.184	23.626
112	19.1	72.696	89.484	65.051	-45.951	2111.537	45.951
113	277.7	70.301	487.496	342.713	-65.013	4226.663	65.013
114	52.2	79.571	73.018	58.101	-5.901	34.825	5.901
115	66.1	78.348	70.099	54.921	11.179	124.965	11.179
116	156	77.800	99.375	77.314	78.686	6191.496	78.686
117	297.9	81.296	170.247	138.404	159.496	25439.021	159.496
118	185.7	90.978	147.137	133.863	51.837	2687.101	51.837
119	71.1	95.212	31.716	30.198	40.902	1672.983	40.902
120	0	94.134	5.243	4.936	-4.936	24.363	4.936
121	0	89.927	2.549	2.292	-2.292	5.252	2.292
122	0.05	85.907	5.381	4.623	-4.573	20.909	4.573
123	0.3	82.069	18.255	14.982	-14.682	215.558	14.682
124	123.1	78.414	89.484	70.168	52.932	2801.822	52.932
125	234.7	80.411	487.496	392.003	-157.303	24744.087	157.303

ตาราง 3.6 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
126	77.4	87.308	73.018	63.750	13.650	186.311	13.650
127	72.7	86.865	70.099	60.892	11.808	139.433	11.808
128	78.8	86.232	99.375	85.693	-6.893	47.512	6.893
129	90.6	85.900	170.247	146.242	-55.642	3096.019	55.642
130	112	86.110	147.137	126.700	-14.700	216.085	14.700
131	217.2	87.267	31.716	27.678	189.522	35918.579	189.522
132	0	93.075	5.243	4.880	-4.880	23.818	4.880
133	0.05	88.915	2.549	2.266	-2.216	4.911	2.216
134	0	84.943	5.381	4.571	-4.571	20.892	4.571
135	2.6	81.146	18.255	14.813	-12.213	149.165	12.213
136	28.6	77.635	89.484	69.470	-40.870	1670.384	40.870
137	197.4	75.443	487.496	367.780	-170.380	29029.450	170.380
138	91.4	80.894	73.018	59.067	32.333	1045.414	32.333
139	38.9	81.364	70.099	57.035	-18.135	328.892	18.135
140	62.3	79.466	99.375	78.969	-16.669	277.850	16.669
141	113.2	78.698	170.247	133.982	-20.782	431.876	20.782
142	182.4	80.241	147.137	118.064	64.336	4139.139	64.336
143	18.6	84.807	31.716	26.898	-8.298	68.853	8.298
144	0	81.848	5.243	4.292	-4.292	18.418	4.292
145	0.4	78.189	2.549	1.993	-1.593	2.537	1.593
146	0	74.712	5.381	4.020	-4.020	16.162	4.020
147	0.05	71.372	18.255	13.029	-12.979	168.459	12.979
148	0.6	68.184	89.484	61.014	-60.414	3649.823	60.414
149	175.2	65.163	487.496	317.668	-142.468	20297.086	142.468
150	98.9	70.082	73.018	51.172	47.728	2277.946	47.728
151	59.7	71.370	70.099	50.030	9.670	93.513	9.670
152	188.9	70.848	99.375	70.405	118.495	14040.983	118.495
153	169	76.125	170.247	129.601	39.399	1552.287	39.399
154	289	80.277	147.137	118.117	170.883	29200.992	170.883
155	214	89.607	31.716	28.420	185.580	34439.931	185.580
156	14.1	95.167	5.243	4.990	9.110	82.991	9.110
157	0.05	91.543	2.549	2.333	-2.283	5.212	2.283
158	21.7	87.454	5.381	4.706	16.994	288.801	16.994
159	0	84.514	18.255	15.428	-15.428	238.032	15.428
160	43.2	80.737	89.484	72.246	-29.046	843.679	29.046
161	116.4	79.059	487.496	385.408	-269.008	72365.390	269.008

ตาราง 3.6 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
162	106.8	80.728	73.018	58.946	47.854	2290.035	47.854
163	60.9	81.893	70.099	57.407	3.493	12.204	3.493
164	71.7	80.955	99.375	80.449	-8.749	76.540	8.749
165	214.6	80.541	170.247	137.119	77.481	6003.308	77.481
166	248.7	86.534	147.137	127.323	121.377	14732.316	121.377
167	2.6	93.782	31.716	29.744	-27.144	736.820	27.144
168	0	89.707	5.243	4.704	-4.704	22.125	4.704
169	0	85.697	2.549	2.184	-2.184	4.770	2.184
170	0	81.866	5.381	4.405	-4.405	19.406	4.405
171	0.8	78.207	18.255	14.277	-13.477	181.624	13.477
172	40.4	74.747	89.484	66.886	-26.486	701.511	26.486
173	148.4	73.211	487.496	356.902	-208.502	43473.152	208.502
174	59.9	76.572	73.018	55.911	3.989	15.910	3.989
175	61.5	75.827	70.099	53.154	8.346	69.654	8.346
176	37.7	75.187	99.375	74.716	-37.016	1370.218	37.016
177	307.3	73.511	170.247	125.150	182.150	33178.580	182.150
178	194.2	83.961	147.137	123.538	70.662	4993.067	70.662
179	118.2	88.889	31.716	28.192	90.008	8101.371	90.008
180	0	90.199	5.243	4.730	-4.730	22.369	4.730
181	0	86.167	2.549	2.196	-2.196	4.822	2.196
182	0	82.316	5.381	4.429	-4.429	19.619	4.429
183	0.05	78.636	18.255	14.355	-14.305	204.638	14.305
184	35	75.123	89.484	67.223	-32.223	1038.330	32.223
185	196.3	73.330	487.496	357.480	-161.180	25978.886	161.180
186	57.7	78.827	73.018	57.557	0.143	0.020	0.143
187	21.8	77.882	70.099	54.595	-32.795	1075.497	32.795
188	120.3	75.375	99.375	74.904	45.396	2060.796	45.396
189	228.6	77.383	170.247	131.743	96.857	9381.286	96.857
190	128.8	84.143	147.137	123.805	4.995	24.945	4.995
191	0.2	86.139	31.716	27.320	-27.120	735.505	27.120
192	6.1	82.298	5.243	4.315	1.785	3.185	1.785
193	0	78.892	2.549	2.011	-2.011	4.042	2.011
194	0	75.365	5.381	4.055	-4.055	16.446	4.055
195	26.4	71.996	18.255	13.143	13.257	175.746	13.257
196	72.6	69.958	89.484	62.601	9.999	99.978	9.999
197	73.3	70.076	487.496	341.618	-268.318	71994.812	268.318

ตาราง 3.6 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
198	169.6	70.220	73.018	51.273	118.327	14001.218	118.327
199	15.6	74.663	70.099	52.338	-36.738	1349.668	36.738
200	256.5	72.022	99.375	71.572	184.928	34198.324	184.928
201	229.4	80.269	170.247	136.655	92.745	8601.663	92.745
202	139.5	86.935	147.137	127.913	11.587	134.248	11.587
203	89.5	89.284	31.716	28.318	61.182	3743.260	61.182
204	0	89.294	5.243	4.682	-4.682	21.922	4.682
205	0	85.303	2.549	2.174	-2.174	4.726	2.174
206	0.1	81.490	5.381	4.385	-4.285	18.361	4.285
207	0	77.851	18.255	14.212	-14.212	201.980	14.212
208	69.8	74.372	89.484	66.550	3.250	10.560	3.250
209	168.5	74.167	487.496	361.562	-193.062	37272.924	193.062
210	244.3	78.384	73.018	57.234	187.066	34993.644	187.066
211	180.3	85.800	70.099	60.145	120.155	14437.151	120.155
212	68.4	90.024	99.375	89.462	-21.062	443.588	21.062
213	183.2	89.058	170.247	151.618	31.582	997.408	31.582
214	414.1	93.266	147.137	137.229	276.871	76657.542	276.871
215	46.4	107.607	31.716	34.129	12.271	150.574	12.271
216	0	104.871	5.243	5.499	-5.499	30.238	5.499
217	0.7	100.184	2.549	2.553	-1.853	3.434	1.853
218	10.4	95.737	5.381	5.152	5.248	27.546	5.248
219	36.7	91.922	18.255	16.781	19.919	396.784	19.919
220	0.05	89.454	89.484	80.046	-79.996	6399.437	79.996
221	133	85.457	487.496	416.601	-283.601	80429.494	283.601
222	80.7	87.582	73.018	63.951	16.749	280.538	16.749
223	59.4	87.275	70.099	61.179	-1.779	3.165	1.779
224	29.6	86.029	99.375	85.491	-55.891	3123.793	55.891
225	76.4	83.506	170.247	142.167	-65.767	4325.324	65.767
226	360.9	83.189	147.137	122.402	238.498	56881.430	238.498
227	5.7	95.602	31.716	30.322	-24.622	606.227	24.622
228	0	91.584	5.243	4.802	-4.802	23.061	4.802
229	0.05	87.490	2.549	2.230	-2.180	4.751	2.180
230	0	83.581	5.381	4.497	-4.497	20.227	4.497
231	2	79.845	18.255	14.576	-12.576	158.154	12.576
232	89.8	76.366	89.484	68.335	21.465	460.751	21.465
233	221.8	76.966	487.496	375.207	-153.407	23533.749	153.407

ตาราง 3.6 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
234	28.5	83.440	73.018	60.926	-32.426	1051.459	32.426
235	19	80.984	70.099	56.769	-37.769	1426.530	37.769
236	74	78.214	99.375	77.725	-3.725	13.873	3.725
237	175.8	78.025	170.247	132.836	42.964	1845.918	42.964
238	297.5	82.396	147.137	121.235	176.265	31069.317	176.265
239	19.8	92.011	31.716	29.183	-9.383	88.033	9.383
240	0	88.783	5.243	4.655	-4.655	21.672	4.655
241	0.5	84.815	2.549	2.162	-1.662	2.761	1.662
242	0	81.046	5.381	4.361	-4.361	19.019	4.361
243	2.4	77.423	18.255	14.134	-11.734	137.680	11.734
244	54.3	74.069	89.484	66.280	-11.980	143.524	11.980
245	40.7	73.186	487.496	356.778	-316.078	99905.132	316.078
246	149.9	71.734	73.018	52.378	97.522	9510.481	97.522
247	57.6	75.228	70.099	52.734	4.866	23.678	4.866
248	160.3	74.440	99.375	73.974	86.326	7452.128	86.326
249	94.6	78.278	170.247	133.265	-38.665	1495.013	38.665
250	316.4	79.007	147.137	116.249	200.151	40060.346	200.151
251	15.8	89.619	31.716	28.424	-12.624	159.361	12.624
252	5.7	86.319	5.243	4.526	1.174	1.378	1.174
253	7.5	82.715	2.549	2.108	5.392	29.074	5.392
254	90.9	79.353	5.381	4.270	86.630	7504.762	86.630
255	0	79.869	18.255	14.580	-14.580	212.586	14.580
256	22.7	76.299	89.484	68.275	-45.575	2077.118	45.575
257	6.6	73.903	487.496	360.276	-353.676	125086.594	353.676
258	75.7	70.895	73.018	51.766	23.934	572.844	23.934
259	202.1	71.110	70.099	49.847	152.253	23180.885	152.253
260	111.1	76.965	99.375	76.484	34.616	1198.288	34.616
261	234.4	78.491	170.247	133.628	100.772	10154.962	100.772
262	230.8	85.460	147.137	125.743	105.057	11036.890	105.057
263	1.4	91.957	31.716	29.165	-27.765	770.914	27.765
264	63.7	87.909	5.243	4.609	59.091	3491.691	59.091
265	0	86.827	2.549	2.213	-2.213	4.896	2.213
266	0	82.945	5.381	4.463	-4.463	19.921	4.463
267	22.9	79.238	18.255	14.465	8.435	71.149	8.435
268	119.4	76.720	89.484	68.651	50.749	2575.412	50.749
269	133.5	78.627	487.496	383.305	-249.805	62402.529	249.805

ตาราง 3.6 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
270	5.7	81.080	73.018	59.203	-53.503	2862.558	53.503
271	49.6	77.711	70.099	54.475	-4.875	23.761	4.875
272	71.1	76.454	99.375	75.976	-4.876	23.776	4.876
273	213.3	76.215	170.247	129.753	83.547	6980.049	83.547
274	152.5	82.342	147.137	121.156	31.344	982.417	31.344
275	0	85.479	31.716	27.111	-27.111	734.990	27.111
276	0	81.658	5.243	4.282	-4.282	18.333	4.282
277	0	78.008	2.549	1.988	-1.988	3.952	1.988
278	0	74.521	5.381	4.010	-4.010	16.080	4.010
279	36.8	71.190	18.255	12.996	23.804	566.640	23.804
280	74.2	69.652	89.484	62.327	11.873	140.956	11.873
281	363.1	69.856	487.496	340.543	22.557	508.811	22.557
282	105.2	82.964	73.018	60.578	44.622	1991.109	44.622
283	71.1	83.958	70.099	58.854	12.246	149.975	12.246
284	134.1	83.383	99.375	82.861	51.239	2625.387	51.239
285	34.6	85.650	170.247	145.816	-111.216	12369.077	111.216
286	118.8	83.368	147.137	122.665	-3.865	14.941	3.865
287	6.4	84.952	31.716	26.944	-20.544	422.041	20.544
288	0	81.441	5.243	4.270	-4.270	18.236	4.270
289	0.05	77.800	2.549	1.983	-1.933	3.736	1.933
290	0	74.325	5.381	3.999	-3.999	15.995	3.999
291	15.8	71.002	18.255	12.962	2.838	8.056	2.838
292	61.3	68.535	89.484	61.328	-0.028	0.001	0.028
293	177.2	68.211	487.496	332.528	-155.328	24126.784	155.328
294	55.5	73.083	73.018	53.364	2.136	4.564	2.136
295	76.1	72.297	70.099	50.680	25.420	646.188	25.420
296	117.2	72.467	99.375	72.014	45.186	2041.764	45.186
297	234.5	74.467	170.247	126.777	107.723	11604.148	107.723
298	105.3	81.620	147.137	120.094	-14.794	218.858	14.794
299	28.2	82.679	31.716	26.223	1.977	3.910	1.977
300	0	80.244	5.243	4.208	-4.208	17.703	4.208
301	0	76.657	2.549	1.954	-1.954	3.817	1.954
302	30.6	73.230	5.381	3.940	26.660	710.730	26.660
303	44	71.325	18.255	13.020	30.980	959.733	30.980
304	155.6	70.103	89.484	62.731	92.869	8624.667	92.869
305	228.5	73.925	487.496	360.381	-131.881	17392.507	131.881

ตาราง 3.6 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
306	250.2	80.834	73.018	59.023	191.177	36548.483	191.177
307	138.6	88.405	70.099	61.971	76.629	5871.976	76.629
308	167.1	90.649	99.375	90.082	77.018	5931.786	77.018
309	375.9	94.066	170.247	160.145	215.755	46550.367	215.755
310	81.2	106.664	147.137	156.943	-75.743	5736.940	75.743
311	77.2	105.526	31.716	33.469	43.731	1912.401	43.731
312	0.05	104.260	5.243	5.467	-5.417	29.342	5.417
313	0	99.601	2.549	2.538	-2.538	6.443	2.538
314	0	95.149	5.381	5.120	-5.120	26.214	5.120
315	44.3	90.896	18.255	16.593	27.707	767.663	27.707
316	74.9	88.813	89.484	79.473	-4.573	20.916	4.573
317	65.4	88.191	487.496	429.929	-364.529	132881.590	364.529
318	17.5	87.173	73.018	63.651	-46.151	2129.956	46.151
319	90.9	84.058	70.099	58.924	31.976	1022.457	31.976
320	221.5	84.364	99.375	83.837	137.663	18951.230	137.663
321	204.2	90.494	170.247	154.063	50.137	2513.687	50.137
322	63.6	95.577	147.137	140.629	-77.029	5933.453	77.029
323	17.3	94.147	31.716	29.860	-12.560	157.757	12.560
324	0	90.712	5.243	4.756	-4.756	22.624	4.756
325	0	86.657	2.549	2.208	-2.208	4.877	2.208
326	0	82.784	5.381	4.455	-4.455	19.843	4.455
327	0	79.083	18.255	14.437	-14.437	208.422	14.437
328	0.05	75.548	89.484	67.603	-67.553	4563.475	67.553
329	90.1	72.174	487.496	351.843	-261.743	68509.540	261.743
330	56.1	72.975	73.018	53.285	2.815	7.926	2.815
331	84.1	72.221	70.099	50.626	33.474	1120.507	33.474
332	110.8	72.752	99.375	72.297	38.503	1482.505	38.503
333	225.2	74.452	170.247	126.753	98.447	9691.837	98.447
334	153.2	81.191	147.137	119.462	33.738	1138.260	33.738
335	42.1	84.410	31.716	26.772	15.328	234.957	15.328
336	1.9	82.518	5.243	4.327	-2.427	5.889	2.427
337	0.9	78.915	2.549	2.011	-1.111	1.235	1.111
338	9.1	75.427	5.381	4.059	5.041	25.414	5.041
339	2.8	72.463	18.255	13.228	-10.428	108.747	10.428
340	179.1	69.349	89.484	62.056	117.044	13699.344	117.044
341	315.2	74.255	487.496	361.988	-46.788	2189.121	46.788

ตาราง 3.6 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
342	60.6	85.025	73.018	62.083	-1.483	2.200	1.483
343	36.1	83.933	70.099	58.836	-22.736	516.943	22.736
344	104.8	81.795	99.375	81.283	23.517	553.028	23.517
345	178.6	82.823	170.247	141.004	37.596	1413.456	37.596
346	264.4	87.104	147.137	128.163	136.237	18560.488	136.237
347	42.7	95.030	31.716	30.140	12.560	157.755	12.560
348	6.4	92.690	5.243	4.860	1.540	2.371	1.540
349	0	88.833	2.549	2.264	-2.264	5.125	2.264
350	30.8	84.862	5.381	4.566	26.234	688.201	26.234
351	7.3	82.446	18.255	15.051	-7.751	60.073	7.751
352	178.7	79.087	89.484	70.770	107.930	11648.923	107.930
353	286.4	83.540	487.496	407.252	-120.852	14605.135	120.852
354	101.2	92.607	73.018	67.620	33.580	1127.629	33.580
355	19.4	92.991	70.099	65.186	-45.786	2096.380	45.786
356	150.2	89.702	99.375	89.141	61.059	3728.197	61.059
357	247.6	92.406	170.247	157.319	90.281	8150.709	90.281
358	324.8	99.343	147.137	146.171	178.629	31908.288	178.629
359	7.4	109.421	31.716	34.704	-27.304	745.535	27.304
360	0	104.861	5.243	5.498	-5.498	30.232	5.498
361	0	100.174	2.549	2.553	-2.553	6.517	2.553
362	0	95.696	5.381	5.149	-5.149	26.516	5.149
363	193.8	91.418	18.255	16.689	177.111	31368.450	177.111
364	0	95.995	89.484	85.900	-85.900	7378.753	85.900
365	398.7	91.704	487.496	447.052	-48.352	2337.926	48.352
366	30.2	105.426	73.018	76.980	-46.780	2188.372	46.780
367	48.8	102.064	70.099	71.546	-22.746	517.377	22.746
368	53.8	99.683	99.375	99.060	-45.260	2048.438	45.260
369	150.1	97.632	170.247	166.216	-16.116	259.710	16.116
370	290.3	99.977	147.137	147.104	143.196	20505.124	143.196
371	22.9	108.485	31.716	34.407	-11.507	132.422	11.507
372	12.3	104.659	5.243	5.488	6.812	46.407	6.812
รวม						2979189.770	20463.134

3.2 รูปแบบเชิงเส้น

3.2.1 วิธีกำลังสองน้อยที่สุด (Least Square Method)

1) ค่าแนวโน้ม (T) จากที่กล่าวไว้ในบทที่ 2 (2.1.2.1) จากสมการแนวโน้ม
 $\hat{Y} = a + bt$ โดยที่

$$a = \bar{Y}$$

$$b = \frac{\sum Y_t t}{\sum t^2}$$

การคำนวณหาค่าแนวโน้มแสดงดังตาราง 3.7 ได้สมการแนวโน้มคือ

$$T = 88.2138 - 0.0078t$$

จุดเริ่มต้น 16 มกราคม 2514

t หน่วย เดือน

T ปริมาณน้ำฝนต่อเดือน

ตาราง 3.7 แสดงการหาค่าแนวโน้มโดยวิธีกำลังสองน้อยที่สุด

เดือน	ข้อมูล Y	t	t ²	Y × t	ค่าแนวโน้ม T = 88.2138 - 0.0078t	Y/T = SCI
1	0	-371	137641	0	88.214	0.000
2	0	-369	136161	0	88.206	0.000
3	13.7	-367	134689	-5027.9	88.198	15.533
4	14.1	-365	133225	-5146.5	88.190	15.988
5	222.7	-363	131769	-80840.1	88.183	252.544
6	55.6	-361	130321	-20071.6	88.175	63.057
7	101.4	-359	128881	-36402.6	88.167	115.009
8	194.9	-357	127449	-69579.3	88.159	221.077
9	182.1	-355	126025	-64645.5	88.151	206.576
10	210.6	-353	124609	-74341.8	88.144	238.928
11	20.4	-351	123201	-7160.4	88.136	23.146
12	18.2	-349	121801	-6351.8	88.128	20.652
13	0.7	-347	120409	-242.9	88.120	0.794
14	3.1	-345	119025	-1069.5	88.112	3.518
15	7.3	-343	117649	-2503.9	88.105	8.286

ตาราง 3.7 (ต่อ)

เดือน	ข้อมูล Y	t	t ²	Y×t	ค่าแนวโน้ม T = 88.2138 – 0.0078t	Y/T = SCI
16	74.7	-341	116281	-25472.7	88.097	84.793
17	112.3	-339	114921	-38069.7	88.089	127.485
18	73.9	-337	113569	-24904.3	88.081	83.900
19	68.8	-335	112225	-23048	88.073	78.117
20	47.4	-333	110889	-15784.2	88.066	53.824
21	380.5	-331	109561	-125945.5	88.058	432.103
22	208.9	-329	108241	-68728.1	88.050	237.252
23	107.4	-327	106929	-35119.8	88.042	121.987
24	29.8	-325	105625	-9685	88.034	33.850
25	0	-323	104329	0	88.027	0.000
26	0	-321	103041	0	88.019	0.000
27	123.6	-319	101761	-39428.4	88.011	140.437
28	0	-317	100489	0	88.003	0.000
29	336.4	-315	99225	-105966	87.995	382.293
30	140.3	-313	97969	-43913.9	87.988	159.454
31	38.7	-311	96721	-12035.7	87.980	43.987
32	119.1	-309	95481	-36801.9	87.972	135.384
33	347.9	-307	94249	-106805.3	87.964	395.502
34	243	-305	93025	-74115	87.956	276.273
35	7.6	-303	91809	-2302.8	87.949	8.641
36	0	-301	90601	0	87.941	0.000
37	0	-299	89401	0	87.933	0.000
38	0	-297	88209	0	87.925	0.000
39	64.3	-295	87025	-18968.5	87.917	73.137
40	123.3	-293	85849	-36126.9	87.910	140.258
41	267.8	-291	84681	-77929.8	87.902	304.658
42	50.6	-289	83521	-14623.4	87.894	57.569
43	90.9	-287	82369	-26088.3	87.886	103.429
44	131	-285	81225	-37335	87.878	149.070
45	267.7	-283	80089	-75759.1	87.871	304.653
46	299.1	-281	78961	-84047.1	87.863	340.417
47	170.2	-279	77841	-47485.8	87.855	193.728
48	3.9	-277	76729	-1080.3	87.847	4.440
49	76.6	-275	75625	-21065	87.839	87.205

ตาราง 3.7 (ต่อ)

เดือน	ข้อมูล Y	t	t ²	Y×t	ค่าแนวโน้ม T = 88.2138 – 0.0078t	Y/T = SCI
50	0	-273	74529	0	87.832	0.000
51	0	-271	73441	0	87.824	0.000
52	3.3	-269	72361	-887.7	87.816	3.758
53	199.3	-267	71289	-53213.1	87.808	226.972
54	107.1	-265	70225	-28381.5	87.800	121.981
55	64.4	-263	69169	-16937.2	87.793	73.355
56	87.8	-261	68121	-22915.8	87.785	100.017
57	192.4	-259	67081	-49831.6	87.777	219.192
58	276.8	-257	66049	-71137.6	87.769	315.373
59	85.1	-255	65025	-21700.5	87.761	96.967
60	33.7	-253	64009	-8526.1	87.754	38.403
61	0	-251	63001	0	87.746	0.000
62	0.3	-249	62001	-74.7	87.738	0.342
63	4.3	-247	61009	-1062.1	87.730	4.901
64	20.9	-245	60025	-5120.5	87.722	23.825
65	166.1	-243	59049	-40362.3	87.715	189.364
66	85.4	-241	58081	-20581.4	87.707	97.370
67	132.4	-239	57121	-31643.6	87.699	150.971
68	169.5	-237	56169	-40171.5	87.691	193.292
69	234.1	-235	55225	-55013.5	87.683	266.983
70	280.1	-233	54289	-65263.3	87.676	319.473
71	43.7	-231	53361	-10094.7	87.668	49.847
72	30.7	-229	52441	-7030.3	87.660	35.022
73	35.9	-227	51529	-8149.3	87.652	40.957
74	0	-225	50625	0	87.644	0.000
75	46.5	-223	49729	-10369.5	87.637	53.060
76	58.2	-221	48841	-12862.2	87.629	66.417
77	103.8	-219	47961	-22732.2	87.621	118.465
78	19.6	-217	47089	-4253.2	87.613	22.371
79	108.8	-215	46225	-23392	87.605	124.193
80	60.7	-213	45369	-12929.1	87.598	69.294
81	213.5	-211	44521	-45048.5	87.590	243.750

ตาราง 3.7 (ต่อ)

เดือน	ข้อมูล Y	t	t ²	Y×t	ค่าแนวโน้ม T = 88.2138 – 0.0078t	Y/T = SCI
82	140.5	-209	43681	-29364.5	87.582	160.421
83	15.6	-207	42849	-3229.2	87.574	17.813
84	0.8	-205	42025	-164	87.566	0.914
85	7.8	-203	41209	-1583.4	87.559	8.908
86	23.9	-201	40401	-4803.9	87.551	27.298
87	0	-199	39601	0	87.543	0.000
88	8.6	-197	38809	-1694.2	87.535	9.825
89	273.7	-195	38025	-53371.5	87.527	312.702
90	53.8	-193	37249	-10383.4	87.520	61.472
91	272.2	-191	36481	-51990.2	87.512	311.044
92	40.4	-189	35721	-7635.6	87.504	46.169
93	248	-187	34969	-46376	87.496	283.441
94	108.9	-185	34225	-20146.5	87.488	124.474
95	0	-183	33489	0	87.481	0.000
96	0	-181	32761	0	87.473	0.000
97	0	-179	32041	0	87.465	0.000
98	0	-177	31329	0	87.457	0.000
99	0	-175	30625	0	87.449	0.000
100	39.4	-173	29929	-6816.2	87.442	45.059
101	156.5	-171	29241	-26761.5	87.434	178.993
102	111.6	-169	28561	-18860.4	87.426	127.651
103	44.8	-167	27889	-7481.6	87.418	51.248
104	89.8	-165	27225	-14817	87.410	102.734
105	362.1	-163	26569	-59022.3	87.403	414.290
106	33.6	-161	25921	-5409.6	87.395	38.446
107	0	-159	25281	0	87.387	0.000
108	0	-157	24649	0	87.379	0.000
109	0	-155	24025	0	87.371	0.000
110	0	-153	23409	0	87.364	0.000
111	37.2	-151	22801	-5617.2	87.356	42.584
112	19.1	-149	22201	-2845.9	87.348	21.867
113	277.7	-147	21609	-40821.9	87.340	317.952

ตาราง 3.7 (ต่อ)

เดือน	ข้อมูล Y	t	t ²	Y×t	ค่าแนวโน้ม T = 88.2138 – 0.0078t	Y/T = SCI
114	52.2	-145	21025	-7569	87.332	59.772
115	66.1	-143	20449	-9452.3	87.325	75.695
116	156	-141	19881	-21996	87.317	178.660
117	297.9	-139	19321	-41408.1	87.309	341.202
118	185.7	-137	18769	-25440.9	87.301	212.712
119	71.1	-135	18225	-9598.5	87.293	81.449
120	0	-133	17689	0	87.286	0.000
121	0	-131	17161	0	87.278	0.000
122	0.05	-129	16641	-6.45	87.270	0.057
123	0.3	-127	16129	-38.1	87.262	0.344
124	123.1	-125	15625	-15387.5	87.254	141.082
125	234.7	-123	15129	-28868.1	87.247	269.008
126	77.4	-121	14641	-9365.4	87.239	88.722
127	72.7	-119	14161	-8651.3	87.231	83.342
128	78.8	-117	13689	-9219.6	87.223	90.343
129	90.6	-115	13225	-10419	87.215	103.881
130	112	-113	12769	-12656	87.208	128.429
131	217.2	-111	12321	-24109.2	87.200	249.083
132	0	-109	11881	0	87.192	0.000
133	0.05	-107	11449	-5.35	87.184	0.057
134	0	-105	11025	0	87.176	0.000
135	2.6	-103	10609	-267.8	87.169	2.983
136	28.6	-101	10201	-2888.6	87.161	32.813
137	197.4	-99	9801	-19542.6	87.153	226.498
138	91.4	-97	9409	-8865.8	87.145	104.882
139	38.9	-95	9025	-3695.5	87.137	44.642
140	62.3	-93	8649	-5793.9	87.130	71.503
141	113.2	-91	8281	-10301.2	87.122	129.933
142	182.4	-89	7921	-16233.6	87.114	209.381
143	18.6	-87	7569	-1618.2	87.106	21.353
144	0	-85	7225	0	87.098	0.000
145	0.4	-83	6889	-33.2	87.091	0.459

ตาราง 3.7 (ต่อ)

เดือน	ข้อมูล Y	t	t ²	Y×t	ค่าแนวโน้ม T = 88.2138 – 0.0078t	Y/T = SCI
146	0	-81	6561	0	87.083	0.000
147	0.05	-79	6241	-3.95	87.075	0.057
148	0.6	-77	5929	-46.2	87.067	0.689
149	175.2	-75	5625	-13140	87.059	201.242
150	98.9	-73	5329	-7219.7	87.052	113.611
151	59.7	-71	5041	-4238.7	87.044	68.586
152	188.9	-69	4761	-13034.1	87.036	217.037
153	169	-67	4489	-11323	87.028	194.190
154	289	-65	4225	-18785	87.020	332.106
155	214	-63	3969	-13482	87.013	245.941
156	14.1	-61	3721	-860.1	87.005	16.206
157	0.05	-59	3481	-2.95	86.997	0.057
158	21.7	-57	3249	-1236.9	86.989	24.946
159	0	-55	3025	0	86.981	0.000
160	43.2	-53	2809	-2289.6	86.974	49.670
161	116.4	-51	2601	-5936.4	86.966	133.846
162	106.8	-49	2401	-5233.2	86.958	122.818
163	60.9	-47	2209	-2862.3	86.950	70.040
164	71.7	-45	2025	-3226.5	86.942	82.468
165	214.6	-43	1849	-9227.8	86.935	246.852
166	248.7	-41	1681	-10196.7	86.927	286.103
167	2.6	-39	1521	-101.4	86.919	2.991
168	0	-37	1369	0	86.911	0.000
169	0	-35	1225	0	86.903	0.000
170	0	-33	1089	0	86.896	0.000
171	0.8	-31	961	-24.8	86.888	0.921
172	40.4	-29	841	-1171.6	86.880	46.501
173	148.4	-27	729	-4006.8	86.872	170.826
174	59.9	-25	625	-1497.5	86.864	68.958
175	61.5	-23	529	-1414.5	86.857	70.806
176	37.7	-21	441	-791.7	86.849	43.409
177	307.3	-19	361	-5838.7	86.841	353.865

ตาราง 3.7 (ต่อ)

เดือน	ข้อมูล Y	t	t ²	Y×t	ค่าแนวโน้ม T = 88.2138 – 0.0078t	Y/T = SCI
178	194.2	-17	289	-3301.4	86.833	223.647
179	118.2	-15	225	-1773	86.825	136.135
180	0	-13	169	0	86.818	0.000
181	0	-11	121	0	86.810	0.000
182	0	-9	81	0	86.802	0.000
183	0.05	-7	49	-0.35	86.794	0.058
184	35	-5	25	-175	86.786	40.329
185	196.3	-3	9	-588.9	86.779	226.208
186	57.7	-1	1	-57.7	86.771	66.497
187	21.8	1	1	21.8	86.763	25.126
188	120.3	3	9	360.9	86.755	138.666
189	228.6	5	25	1143	86.747	263.524
190	128.8	7	49	901.6	86.740	148.490
191	0.2	9	81	1.8	86.732	0.231
192	6.1	11	121	67.1	86.724	7.034
193	0	13	169	0	86.716	0.000
194	0	15	225	0	86.708	0.000
195	26.4	17	289	448.8	86.701	30.450
196	72.6	19	361	1379.4	86.693	83.744
197	73.3	21	441	1539.3	86.685	84.559
198	169.6	23	529	3900.8	86.677	195.669
199	15.6	25	625	390	86.669	17.999
200	256.5	27	729	6925.5	86.662	295.979
201	229.4	29	841	6652.6	86.654	264.732
202	139.5	31	961	4324.5	86.646	161.000
203	89.5	33	1089	2953.5	86.638	103.303
204	0	35	1225	0	86.630	0.000
205	0	37	1369	0	86.623	0.000
206	0.1	39	1521	3.9	86.615	0.115
207	0	41	1681	0	86.607	0.000
208	69.8	43	1849	3001.4	86.599	80.601
209	168.5	45	2025	7582.5	86.591	194.592

ตาราง 3.7 (ต่อ)

เดือน	ข้อมูล Y	t	t ²	Y×t	ค่าแนวโน้ม T = 88.2138 – 0.0078t	Y/T = SCI
210	244.3	47	2209	11482.1	86.584	282.155
211	180.3	49	2401	8834.7	86.576	208.257
212	68.4	51	2601	3488.4	86.568	79.013
213	183.2	53	2809	9709.6	86.560	211.645
214	414.1	55	3025	22775.5	86.552	478.438
215	46.4	57	3249	2644.8	86.545	53.614
216	0	59	3481	0	86.537	0.000
217	0.7	61	3721	42.7	86.529	0.809
218	10.4	63	3969	655.2	86.521	12.020
219	36.7	65	4225	2385.5	86.513	42.421
220	0.05	67	4489	3.35	86.506	0.058
221	133	69	4761	9177	86.498	153.761
222	80.7	71	5041	5729.7	86.490	93.306
223	59.4	73	5329	4336.2	86.482	68.685
224	29.6	75	5625	2220	86.474	34.230
225	76.4	77	5929	5882.8	86.467	88.358
226	360.9	79	6241	28511.1	86.459	417.424
227	5.7	81	6561	461.7	86.451	6.593
228	0	83	6889	0	86.443	0.000
229	0.05	85	7225	4.25	86.435	0.058
230	0	87	7569	0	86.428	0.000
231	2	89	7921	178	86.420	2.314
232	89.8	91	8281	8171.8	86.412	103.921
233	221.8	93	8649	20627.4	86.404	256.700
234	28.5	95	9025	2707.5	86.396	32.987
235	19	97	9409	1843	86.389	21.994
236	74	99	9801	7326	86.381	85.667
237	175.8	101	10201	17755.8	86.373	203.536
238	297.5	103	10609	30642.5	86.365	344.467
239	19.8	105	11025	2079	86.357	22.928
240	0	107	11449	0	86.350	0.000
241	0.5	109	11881	54.5	86.342	0.579

ตาราง 3.7 (ต่อ)

เดือน	ข้อมูล Y	t	t ²	Y×t	ค่าแนวโน้ม T = 88.2138 – 0.0078t	Y/T = SCI
242	0	111	12321	0	86.334	0.000
243	2.4	113	12769	271.2	86.326	2.780
244	54.3	115	13225	6244.5	86.318	62.907
245	40.7	117	13689	4761.9	86.311	47.155
246	149.9	119	14161	17838.1	86.303	173.691
247	57.6	121	14641	6969.6	86.295	66.748
248	160.3	123	15129	19716.9	86.287	185.775
249	94.6	125	15625	11825	86.279	109.644
250	316.4	127	16129	40182.8	86.272	366.749
251	15.8	129	16641	2038.2	86.264	18.316
252	5.7	131	17161	746.7	86.256	6.608
253	7.5	133	17689	997.5	86.248	8.696
254	90.9	135	18225	12271.5	86.240	105.403
255	0	137	18769	0	86.233	0.000
256	22.7	139	19321	3155.3	86.225	26.327
257	6.6	141	19881	930.6	86.217	7.655
258	75.7	143	20449	10825.1	86.209	87.810
259	202.1	145	21025	29304.5	86.201	234.451
260	111.1	147	21609	16331.7	86.194	128.896
261	234.4	149	22201	34925.6	86.186	271.971
262	230.8	151	22801	34850.8	86.178	267.818
263	1.4	153	23409	214.2	86.170	1.625
264	63.7	155	24025	9873.5	86.162	73.930
265	0	157	24649	0	86.155	0.000
266	0	159	25281	0	86.147	0.000
267	22.9	161	25921	3686.9	86.139	26.585
268	119.4	163	26569	19462.2	86.131	138.626
269	133.5	165	27225	22027.5	86.123	155.010
270	5.7	167	27889	951.9	86.116	6.619
271	49.6	169	28561	8382.4	86.108	57.602
272	71.1	171	29241	12158.1	86.100	82.578

ตาราง 3.7 (ต่อ)

เดือน	ข้อมูล Y	t	t ²	Y×t	ค่าแนวโน้ม T = 88.2138 – 0.0078t	Y/T = SCI
273	213.3	173	29929	36900.9	86.092	247.758
274	152.5	175	30625	26687.5	86.084	177.152
275	0	177	31329	0	86.077	0.000
276	0	179	32041	0	86.069	0.000
277	0	181	32761	0	86.061	0.000
278	0	183	33489	0	86.053	0.000
279	36.8	185	34225	6808	86.045	42.768
280	74.2	187	34969	13875.4	86.038	86.241
281	363.1	189	35721	68625.9	86.030	422.063
282	105.2	191	36481	20093.2	86.022	122.294
283	71.1	193	37249	13722.3	86.014	82.661
284	134.1	195	38025	26149.5	86.006	155.919
285	34.6	197	38809	6816.2	85.999	40.233
286	118.8	199	39601	23641.2	85.991	138.154
287	6.4	201	40401	1286.4	85.983	7.443
288	0	203	41209	0	85.975	0.000
289	0.05	205	42025	10.25	85.967	0.058
290	0	207	42849	0	85.960	0.000
291	15.8	209	43681	3302.2	85.952	18.382
292	61.3	211	44521	12934.3	85.944	71.326
293	177.2	213	45369	37743.6	85.936	206.199
294	55.5	215	46225	11932.5	85.928	64.589
295	76.1	217	47089	16513.7	85.921	88.570
296	117.2	219	47961	25666.8	85.913	136.417
297	234.5	221	48841	51824.5	85.905	272.976
298	105.3	223	49729	23481.9	85.897	122.588
299	28.2	225	50625	6345	85.889	32.833
300	0	227	51529	0	85.882	0.000
301	0	229	52441	0	85.874	0.000
302	30.6	231	53361	7068.6	85.866	35.637
303	44	233	54289	10252	85.858	51.247

ตาราง 3.7 (ต่อ)

เดือน	ข้อมูล Y	t	t ²	Y×t	ค่าแนวโน้ม T = 88.2138 – 0.0078t	Y/T = SCI
304	155.6	235	55225	36566	85.850	181.246
305	228.5	237	56169	54154.5	85.843	266.185
306	250.2	239	57121	59797.8	85.835	291.490
307	138.6	241	58081	33402.6	85.827	161.488
308	167.1	243	59049	40605.3	85.819	194.712
309	375.9	245	60025	92095.5	85.811	438.054
310	81.2	247	61009	20056.4	85.804	94.635
311	77.2	249	62001	19222.8	85.796	89.981
312	0.05	251	63001	12.55	85.788	0.058
313	0	253	64009	0	85.780	0.000
314	0	255	65025	0	85.772	0.000
315	44.3	257	66049	11385.1	85.765	51.653
316	74.9	259	67081	19399.1	85.757	87.340
317	65.4	261	68121	17069.4	85.749	76.269
318	17.5	263	69169	4602.5	85.741	20.410
319	90.9	265	70225	24088.5	85.733	106.026
320	221.5	267	71289	59140.5	85.726	258.383
321	204.2	269	72361	54929.8	85.718	238.224
322	63.6	271	73441	17235.6	85.710	74.204
323	17.3	273	74529	4722.9	85.702	20.186
324	0	275	75625	0	85.694	0.000
325	0	277	76729	0	85.687	0.000
326	0	279	77841	0	85.679	0.000
327	0	281	78961	0	85.671	0.000
328	0.05	283	80089	14.15	85.663	0.058
329	90.1	285	81225	25678.5	85.655	105.189
330	56.1	287	82369	16100.7	85.648	65.501
331	84.1	289	83521	24304.9	85.640	98.202
332	110.8	291	84681	32242.8	85.632	129.391
333	225.2	293	85849	65983.6	85.624	263.010
334	153.2	295	87025	45194	85.616	178.938
335	42.1	297	88209	12503.7	85.609	49.177

ตาราง 3.7 (ต่อ)

เดือน	ข้อมูล Y	t	t ²	Y×t	ค่าแนวโน้ม T = 88.2138 – 0.0078t	Y/T = SCI
336	1.9	299	89401	568.1	85.601	2.220
337	0.9	301	90601	270.9	85.593	1.051
338	9.1	303	91809	2757.3	85.585	10.633
339	2.8	305	93025	854	85.577	3.272
340	179.1	307	94249	54983.7	85.570	209.303
341	315.2	309	95481	97396.8	85.562	368.389
342	60.6	311	96721	18846.6	85.554	70.832
343	36.1	313	97969	11299.3	85.546	42.199
344	104.8	315	99225	33012	85.538	122.518
345	178.6	317	100489	56616.2	85.531	208.814
346	264.4	319	101761	84343.6	85.523	309.157
347	42.7	321	103041	13706.7	85.515	49.933
348	6.4	323	104329	2067.2	85.507	7.485
349	0	325	105625	0	85.499	0.000
350	30.8	327	106929	10071.6	85.492	36.027
351	7.3	329	108241	2401.7	85.484	8.540
352	178.7	331	109561	59149.7	85.476	209.065
353	286.4	333	110889	95371.2	85.468	335.095
354	101.2	335	112225	33902	85.460	118.417
355	19.4	337	113569	6537.8	85.453	22.703
356	150.2	339	114921	50917.8	85.445	175.786
357	247.6	341	116281	84431.6	85.437	289.804
358	324.8	343	117649	111406.4	85.429	380.198
359	7.4	345	119025	2553	85.421	8.663
360	0	347	120409	0	85.414	0.000
361	0	349	121801	0	85.406	0.000
362	0	351	123201	0	85.398	0.000
363	193.8	353	124609	68411.4	85.390	226.958
364	0	355	126025	0	85.382	0.000
365	398.7	357	127449	142335.9	85.375	467.001
366	30.2	359	128881	10841.8	85.367	35.377
367	48.8	361	130321	17616.8	85.359	57.170

ตาราง 3.7 (ต่อ)

เดือน	ข้อมูล Y	t	t ²	Y×t	ค่าแนวโน้ม T = 88.2138 – 0.0078t	Y/T = SCI
368	53.8	363	131769	19529.4	85.351	63.034
369	150.1	365	133225	54786.5	85.343	175.878
370	290.3	367	134689	106540.1	85.336	340.186
371	22.9	369	136161	8450.1	85.328	26.838
372	12.3	371	137641	4563.3	85.320	14.416
รวม	32277.3		17159492	-66415.7		

2) ดัชนีฤดูกาล (Seasonal Index) ในการคำนวณค่าดัชนีฤดูกาลจะใช้วิธีอัตราส่วนต่อค่าแนวโน้ม จากการหาค่าแนวโน้มโดยวิธีกำลังสองน้อยที่สุด ดังตาราง 3.7 เมื่อทำการหาค่าแนวโน้มโดยการหารข้อมูลจริงด้วยค่าแนวโน้ม (Y/T) จะได้ค่า SCI และใช้ SCI นี้ไปหาดัชนีฤดูกาล ดังตาราง 3.8

จะเห็นว่าเมื่อนำค่าดัชนีฤดูกาลของทุกเดือนมารวมกันจะได้เท่ากับ 1,200 เพราะเป็นค่าดัชนีฤดูกาลที่ปรับแล้ว (normalized seasonal index) เนื่องจากเราคำนวณค่าดัชนีฤดูกาลในรูปแบบเปอร์เซ็นต์ นั่นหมายถึง ถ้าปริมาณน้ำฝนในเดือนใดมีค่าดัชนีฤดูกาลเท่ากับ 100 แสดงว่าไม่มีอิทธิพลของฤดูกาลต่อปริมาณน้ำฝน แต่ถ้าค่าดัชนีฤดูกาลในเดือนใดมีค่ามากกว่า 100 แสดงว่าอิทธิพลของฤดูกาลต่อปริมาณน้ำฝนในเดือนนั้นสูงกว่าปริมาณน้ำฝนเฉลี่ย และถ้าค่าดัชนีฤดูกาลใดมีค่าน้อยกว่า 100 แสดงว่าอิทธิพลของฤดูกาลในเดือนนั้นทำให้ปริมาณน้ำฝนต่ำกว่าปริมาณน้ำฝนเฉลี่ย

ตาราง 3.8 แสดงค่าดัชนีฤดูกาล

ปี	เดือน											
	ม.ค.	ก.พ.	มี.ค.	เม.ย.	พ.ค.	มิ.ย.	ก.ค.	ส.ค.	ก.ย.	ต.ค.	พ.ย.	ธ.ค.
2514	0.000	0.000	15.533	15.988	252.544	63.057	115.009	221.077	206.576	238.928	23.146	20.652
2515	0.794	3.518	8.286	84.793	127.485	83.900	78.117	53.824	432.103	237.252	121.987	33.850
2516	0.000	0.000	140.437	0.000	382.293	159.454	43.987	135.384	395.502	276.273	8.641	0.000
2517	0.000	0.000	73.137	140.258	304.658	57.569	103.429	149.070	304.653	340.417	193.728	4.440
2518	87.205	0.000	0.000	3.758	226.972	121.981	73.355	100.017	219.192	315.373	96.967	38.403
2519	0.000	0.342	4.901	23.825	189.364	97.370	150.971	193.292	266.983	319.473	49.847	35.022
2520	40.957	0.000	53.060	66.417	118.465	22.371	124.193	69.294	243.750	160.421	17.813	0.914
2521	8.908	27.298	0.000	9.825	312.702	61.472	311.044	46.169	283.441	124.474	0.000	0.000
2522	0.000	0.000	0.000	45.059	178.993	127.651	51.248	102.734	414.290	38.446	0.000	0.000
2523	0.000	0.000	42.584	21.867	317.952	59.772	75.695	178.660	341.202	212.712	81.449	0.000
2524	0.000	0.057	0.344	141.082	269.008	88.722	83.342	90.343	103.881	128.429	249.083	0.000
2525	0.057	0.000	2.983	32.813	226.498	104.882	44.642	71.503	129.933	209.381	21.353	0.000
2526	0.459	0.000	0.057	0.689	201.242	113.611	68.586	217.037	194.190	332.106	245.941	16.206
2527	0.057	24.946	0.000	49.670	133.846	122.818	70.040	82.468	246.852	286.103	2.991	0.000
2528	0.000	0.000	0.921	46.501	170.826	68.958	70.806	43.409	353.865	223.647	136.135	0.000
2529	0.000	0.000	0.058	40.329	226.208	66.497	25.126	138.666	263.524	148.490	0.231	7.034
2530	0.000	0.000	30.450	83.744	84.559	195.669	17.999	295.979	264.732	161.000	103.303	0.000
2531	0.000	0.115	0.000	80.601	194.592	282.155	208.257	79.013	211.645	478.438	53.614	0.000
2532	0.809	12.020	42.421	0.058	153.761	93.306	68.685	34.230	88.358	417.424	6.593	0.000
2533	0.058	0.000	2.314	103.921	256.700	32.987	21.994	85.667	203.536	344.467	22.928	0.000
2534	0.579	0.000	2.780	62.907	47.155	173.691	66.748	185.775	109.644	366.749	18.316	6.608
2535	8.696	105.403	0.000	26.327	7.655	87.810	234.451	128.896	271.971	267.818	1.625	73.930
2536	0.000	0.000	26.585	138.626	155.010	6.619	57.602	82.578	247.758	177.152	0.000	0.000
2537	0.000	0.000	42.768	86.241	422.063	122.294	82.661	155.919	40.233	138.154	7.443	0.000
2538	0.058	0.000	18.382	71.326	206.199	64.589	88.570	136.417	272.976	122.588	32.833	0.000
2539	0.000	35.637	51.247	181.246	266.185	291.490	161.488	194.712	438.054	94.635	89.981	0.058
2540	0.000	0.000	51.653	87.340	76.269	20.410	106.026	258.383	238.224	74.204	20.186	0.000
2541	0.000	0.000	0.000	0.058	105.189	65.501	98.202	129.391	263.010	178.938	49.177	2.220
2542	1.051	10.633	3.272	209.303	368.389	70.832	42.199	122.518	208.814	309.157	49.933	7.485
2543	0.000	36.027	8.540	209.065	335.095	118.417	22.703	175.786	289.804	380.198	8.663	0.000
2544	0.000	0.000	226.958	0.000	467.001	35.377	57.170	63.034	175.878	340.186	26.838	14.416
รวม	149.690	255.997	849.671	2063.633	6784.878	3081.232	2824.345	4021.243	7724.570	7443.034	1740.749	261.237
S	4.829	8.258	27.409	66.569	218.867	99.395	91.108	129.718	249.180	240.098	56.153	8.427

3) การพยากรณ์

จากรูปแบบของการพยากรณ์คือ $\hat{Y} = T \times S$ เมื่อได้ส่วนของค่าแนวโน้ม (T) และดัชนีฤดูกาล (S) แล้วทำการหาค่าพยากรณ์ และ ค่าความคลาดเคลื่อน ดังแสดงในตาราง 3.9 ซึ่งวิธีกำลังสองน้อยที่สุดนี้ คำนวณค่า MSE และ MAD ได้

$$MSE = 3,531.380 \quad MAD = 40.485$$

ตาราง 3.9 แสดงการพยากรณ์อนุกรมเวลาโดยวิธีกำลังสองน้อยที่สุด

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
1	0	88.214	4.829	4.260	-4.260	18.144	4.260
2	0	88.206	8.258	7.284	-7.284	53.057	7.284
3	13.7	88.198	27.409	24.174	-10.474	109.705	10.474
4	14.1	88.190	66.569	58.707	-44.607	1989.812	44.607
5	222.7	88.183	218.867	193.003	29.697	881.934	29.697
6	55.6	88.175	99.395	87.641	-32.041	1026.624	32.041
7	101.4	88.167	91.108	80.327	21.073	444.067	21.073
8	194.9	88.159	129.718	114.358	80.542	6487.026	80.542
9	182.1	88.151	249.180	219.655	-37.555	1410.405	37.555
10	210.6	88.144	240.098	211.631	-1.031	1.063	1.031
11	20.4	88.136	56.153	49.491	-29.091	846.289	29.091
12	18.2	88.128	8.427	7.427	10.773	116.067	10.773
13	0.7	88.120	4.829	4.255	-3.555	12.639	3.555
14	3.1	88.112	8.258	7.276	-4.176	17.441	4.176
15	7.3	88.105	27.409	24.148	-16.848	283.868	16.848
16	74.7	88.097	66.569	58.645	16.055	257.763	16.055
17	112.3	88.089	218.867	192.798	-80.498	6479.892	80.498
18	73.9	88.081	99.395	87.548	-13.648	186.266	13.648
19	68.8	88.073	91.108	80.242	-11.442	130.915	11.442
20	47.4	88.066	129.718	114.237	-66.837	4467.119	66.837
21	380.5	88.058	249.180	219.422	161.078	25946.080	161.078
22	208.9	88.050	240.098	211.406	-2.506	6.281	2.506
23	107.4	88.042	56.153	49.438	57.962	3359.536	57.962
24	29.8	88.034	8.427	7.419	22.381	500.924	22.381
25	0	88.027	4.829	4.251	-4.251	18.067	4.251
26	0	88.019	8.258	7.269	-7.269	52.832	7.269
27	123.6	88.011	27.409	24.123	99.477	9895.729	99.477
28	0	88.003	66.569	58.583	-58.583	3431.932	58.583

ตาราง 3.9 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
29	336.4	87.995	218.867	192.593	143.807	20680.478	143.807
30	140.3	87.988	99.395	87.455	52.845	2792.604	52.845
31	38.7	87.980	91.108	80.157	-41.457	1718.645	41.457
32	119.1	87.972	129.718	114.115	4.985	24.849	4.985
33	347.9	87.964	249.180	219.189	128.711	16566.548	128.711
34	243	87.956	240.098	211.181	31.819	1012.421	31.819
35	7.6	87.949	56.153	49.386	-41.786	1746.064	41.786
36	0	87.941	8.427	7.411	-7.411	54.920	7.411
37	0	87.933	4.829	4.246	-4.246	18.029	4.246
38	0	87.925	8.258	7.261	-7.261	52.720	7.261
39	64.3	87.917	27.409	24.097	40.203	1616.276	40.203
40	123.3	87.910	66.569	58.520	64.780	4196.399	64.780
41	267.8	87.902	218.867	192.388	75.412	5686.961	75.412
42	50.6	87.894	99.395	87.362	-36.762	1351.435	36.762
43	90.9	87.886	91.108	80.071	10.829	117.261	10.829
44	131	87.878	129.718	113.994	17.006	289.215	17.006
45	267.7	87.871	249.180	218.956	48.744	2376.010	48.744
46	299.1	87.863	240.098	210.957	88.143	7769.240	88.143
47	170.2	87.855	56.153	49.333	120.867	14608.741	120.867
48	3.9	87.847	8.427	7.403	-3.503	12.270	3.503
49	76.6	87.839	4.829	4.242	72.358	5235.751	72.358
50	0	87.832	8.258	7.253	-7.253	52.607	7.253
51	0	87.824	27.409	24.071	-24.071	579.433	24.071
52	3.3	87.816	66.569	58.458	-55.158	3042.413	55.158
53	199.3	87.808	218.867	192.183	7.117	50.649	7.117
54	107.1	87.800	99.395	87.269	19.831	393.275	19.831
55	64.4	87.793	91.108	79.986	-15.586	242.923	15.586
56	87.8	87.785	129.718	113.872	-26.072	679.763	26.072
57	192.4	87.777	249.180	218.722	-26.322	692.871	26.322
58	276.8	87.769	240.098	210.732	66.068	4364.984	66.068
59	85.1	87.761	56.153	49.281	35.819	1283.014	35.819
60	33.7	87.754	8.427	7.395	26.305	691.953	26.305
61	0	87.746	4.829	4.237	-4.237	17.952	4.237
62	0.3	87.738	8.258	7.245	-6.945	48.238	6.945
63	4.3	87.730	27.409	24.046	-19.746	389.895	19.746
64	20.9	87.722	66.569	58.396	-37.496	1405.932	37.496

ตาราง 3.9 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
65	166.1	87.715	218.867	191.978	-25.878	669.688	25.878
66	85.4	87.707	99.395	87.176	-1.776	3.153	1.776
67	132.4	87.699	91.108	79.901	52.499	2756.175	52.499
68	169.5	87.691	129.718	113.751	55.749	3107.968	55.749
69	234.1	87.683	249.180	218.489	15.611	243.697	15.611
70	280.1	87.676	240.098	210.507	69.593	4843.152	69.593
71	43.7	87.668	56.153	49.228	-5.528	30.562	5.528
72	30.7	87.660	8.427	7.387	23.313	543.491	23.313
73	35.9	87.652	4.829	4.232	31.668	1002.832	31.668
74	0	87.644	8.258	7.238	-7.238	52.383	7.238
75	46.5	87.637	27.409	24.020	22.480	505.346	22.480
76	58.2	87.629	66.569	58.333	-0.133	0.018	0.133
77	103.8	87.621	218.867	191.773	-87.973	7739.332	87.973
78	19.6	87.613	99.395	87.083	-67.483	4553.924	67.483
79	108.8	87.605	91.108	79.815	28.985	840.105	28.985
80	60.7	87.598	129.718	113.629	-52.929	2801.525	52.929
81	213.5	87.590	249.180	218.256	-4.756	22.619	4.756
82	140.5	87.582	240.098	210.283	-69.783	4869.599	69.783
83	15.6	87.574	56.153	49.176	-33.576	1127.328	33.576
84	0.8	87.566	8.427	7.379	-6.579	43.286	6.579
85	7.8	87.559	4.829	4.228	3.572	12.760	3.572
86	23.9	87.551	8.258	7.230	16.670	277.892	16.670
87	0	87.543	27.409	23.994	-23.994	575.733	23.994
88	8.6	87.535	66.569	58.271	-49.671	2467.223	49.671
89	273.7	87.527	218.867	191.569	82.131	6745.564	82.131
90	53.8	87.520	99.395	86.990	-33.190	1101.558	33.190
91	272.2	87.512	91.108	79.730	192.470	37044.639	192.470
92	40.4	87.504	129.718	113.508	-73.108	5344.782	73.108
93	248	87.496	249.180	218.023	29.977	898.636	29.977
94	108.9	87.488	240.098	210.058	-101.158	10232.897	101.158
95	0	87.481	56.153	49.123	-49.123	2413.083	49.123
96	0	87.473	8.427	7.371	-7.371	54.337	7.371
97	0	87.465	4.829	4.223	-4.223	17.837	4.223
98	0	87.457	8.258	7.222	-7.222	52.160	7.222
99	0	87.449	27.409	23.969	-23.969	574.503	23.969
100	39.4	87.442	66.569	58.209	-18.809	353.772	18.809

ตาราง 3.9 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
101	156.5	87.434	218.867	191.364	-34.864	1215.482	34.864
102	111.6	87.426	99.395	86.897	24.703	610.253	24.703
103	44.8	87.418	91.108	79.645	-34.845	1214.166	34.845
104	89.8	87.410	129.718	113.387	-23.587	556.328	23.587
105	362.1	87.403	249.180	217.790	144.310	20825.519	144.310
106	33.6	87.395	240.098	209.833	-176.233	31058.088	176.233
107	0	87.387	56.153	49.071	-49.071	2407.922	49.071
108	0	87.379	8.427	7.363	-7.363	54.220	7.363
109	0	87.371	4.829	4.219	-4.219	17.799	4.219
110	0	87.364	8.258	7.214	-7.214	52.048	7.214
111	37.2	87.356	27.409	23.943	13.257	175.744	13.257
112	19.1	87.348	66.569	58.147	-39.047	1524.632	39.047
113	277.7	87.340	218.867	191.159	86.541	7489.362	86.541
114	52.2	87.332	99.395	86.804	-34.604	1197.414	34.604
115	66.1	87.325	91.108	79.560	-13.460	181.161	13.460
116	156	87.317	129.718	113.265	42.735	1826.264	42.735
117	297.9	87.309	249.180	217.556	80.344	6455.114	80.344
118	185.7	87.301	240.098	209.608	-23.908	571.608	23.908
119	71.1	87.293	56.153	49.018	22.082	487.614	22.082
120	0	87.286	8.427	7.356	-7.356	54.104	7.356
121	0	87.278	4.829	4.214	-4.214	17.761	4.214
122	0.05	87.270	8.258	7.207	-7.157	51.219	7.157
123	0.3	87.262	27.409	23.917	-23.617	557.785	23.617
124	123.1	87.254	66.569	58.084	65.016	4227.051	65.016
125	234.7	87.247	218.867	190.954	43.746	1913.709	43.746
126	77.4	87.239	99.395	86.711	-9.311	86.688	9.311
127	72.7	87.231	91.108	79.474	-6.774	45.892	6.774
128	78.8	87.223	129.718	113.144	-34.344	1179.495	34.344
129	90.6	87.215	249.180	217.323	-126.723	16058.729	126.723
130	112	87.208	240.098	209.384	-97.384	9483.563	97.384
131	217.2	87.200	56.153	48.965	168.235	28302.860	168.235
132	0	87.192	8.427	7.348	-7.348	53.988	7.348
133	0.05	87.184	4.829	4.210	-4.160	17.305	4.160
134	0	87.176	8.258	7.199	-7.199	51.825	7.199
135	2.6	87.169	27.409	23.892	-21.292	453.342	21.292
136	28.6	87.161	66.569	58.022	-29.422	865.649	29.422

ตาราง 3.9 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
137	197.4	87.153	218.867	190.749	6.651	44.233	6.651
138	91.4	87.145	99.395	86.618	4.782	22.871	4.782
139	38.9	87.137	91.108	79.389	-40.489	1639.363	40.489
140	62.3	87.130	129.718	113.022	-50.722	2572.757	50.722
141	113.2	87.122	249.180	217.090	-103.890	10793.092	103.890
142	182.4	87.114	240.098	209.159	-26.759	716.036	26.759
143	18.6	87.106	56.153	48.913	-30.313	918.872	30.313
144	0	87.098	8.427	7.340	-7.340	53.872	7.340
145	0.4	87.091	4.829	4.205	-3.805	14.481	3.805
146	0	87.083	8.258	7.191	-7.191	51.714	7.191
147	0.05	87.075	27.409	23.866	-23.816	567.210	23.816
148	0.6	87.067	66.569	57.960	-57.360	3290.124	57.360
149	175.2	87.059	218.867	190.544	-15.344	235.448	15.344
150	98.9	87.052	99.395	86.525	12.375	153.151	12.375
151	59.7	87.044	91.108	79.304	-19.604	384.308	19.604
152	188.9	87.036	129.718	112.901	75.999	5775.857	75.999
153	169	87.028	249.180	216.857	-47.857	2290.252	47.857
154	289	87.020	240.098	208.934	80.066	6410.545	80.066
155	214	87.013	56.153	48.860	165.140	27271.106	165.140
156	14.1	87.005	8.427	7.332	6.768	45.807	6.768
157	0.05	86.997	4.829	4.201	-4.151	17.229	4.151
158	21.7	86.989	8.258	7.184	14.516	210.728	14.516
159	0	86.981	27.409	23.841	-23.841	568.370	23.841
160	43.2	86.974	66.569	57.897	-14.697	216.011	14.697
161	116.4	86.966	218.867	190.339	-73.939	5467.044	73.939
162	106.8	86.958	99.395	86.432	20.368	414.874	20.368
163	60.9	86.950	91.108	79.218	-18.318	335.567	18.318
164	71.7	86.942	129.718	112.780	-41.080	1687.527	41.080
165	214.6	86.935	249.180	216.623	-2.023	4.094	2.023
166	248.7	86.927	240.098	208.709	39.991	1599.249	39.991
167	2.6	86.919	56.153	48.808	-46.208	2135.159	46.208
168	0	86.911	8.427	7.324	-7.324	53.641	7.324
169	0	86.903	4.829	4.196	-4.196	17.609	4.196
170	0	86.896	8.258	7.176	-7.176	51.492	7.176
171	0.8	86.888	27.409	23.815	-23.015	529.684	23.015
172	40.4	86.880	66.569	57.835	-17.435	303.979	17.435

ตาราง 3.9 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
173	148.4	86.872	218.867	190.135	-41.735	1741.777	41.735
174	59.9	86.864	99.395	86.339	-26.439	698.994	26.439
175	61.5	86.857	91.108	79.133	-17.633	310.930	17.633
176	37.7	86.849	129.718	112.658	-74.958	5618.718	74.958
177	307.3	86.841	249.180	216.390	90.910	8264.608	90.910
178	194.2	86.833	240.098	208.485	-14.285	204.051	14.285
179	118.2	86.825	56.153	48.755	69.445	4822.577	69.445
180	0	86.818	8.427	7.316	-7.316	53.526	7.316
181	0	86.810	4.829	4.192	-4.192	17.571	4.192
182	0	86.802	8.258	7.168	-7.168	51.381	7.168
183	0.05	86.794	27.409	23.789	-23.739	563.550	23.739
184	35	86.786	66.569	57.773	-22.773	518.595	22.773
185	196.3	86.779	218.867	189.930	6.370	40.580	6.370
186	57.7	86.771	99.395	86.245	-28.545	814.844	28.545
187	21.8	86.763	91.108	79.048	-57.248	3277.327	57.248
188	120.3	86.755	129.718	112.537	7.763	60.269	7.763
189	228.6	86.747	249.180	216.157	12.443	154.831	12.443
190	128.8	86.740	240.098	208.260	-79.460	6313.880	79.460
191	0.2	86.732	56.153	48.703	-48.503	2352.508	48.503
192	6.1	86.724	8.427	7.308	-1.208	1.460	1.208
193	0	86.716	4.829	4.187	-4.187	17.533	4.187
194	0	86.708	8.258	7.160	-7.160	51.271	7.160
195	26.4	86.701	27.409	23.764	2.636	6.951	2.636
196	72.6	86.693	66.569	57.710	14.890	221.701	14.890
197	73.3	86.685	218.867	189.725	-116.425	13554.753	116.425
198	169.6	86.677	99.395	86.152	83.448	6963.496	83.448
199	15.6	86.669	91.108	78.963	-63.363	4014.828	63.363
200	256.5	86.662	129.718	112.415	144.085	20760.407	144.085
201	229.4	86.654	249.180	215.924	13.476	181.612	13.476
202	139.5	86.646	240.098	208.035	-68.535	4697.073	68.535
203	89.5	86.638	56.153	48.650	40.850	1668.714	40.850
204	0	86.630	8.427	7.300	-7.300	53.295	7.300
205	0	86.623	4.829	4.183	-4.183	17.495	4.183
206	0.1	86.615	8.258	7.153	-7.053	49.739	7.053
207	0	86.607	27.409	23.738	-23.738	563.488	23.738
208	69.8	86.599	66.569	57.648	12.152	147.670	12.152

ตาราง 3.9 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
209	168.5	86.591	218.867	189.520	-21.020	441.841	21.020
210	244.3	86.584	99.395	86.059	158.241	25040.087	158.241
211	180.3	86.576	91.108	78.877	101.423	10286.546	101.423
212	68.4	86.568	129.718	112.294	-43.894	1926.671	43.894
213	183.2	86.560	249.180	215.690	-32.490	1055.627	32.490
214	414.1	86.552	240.098	207.810	206.290	42555.372	206.290
215	46.4	86.545	56.153	48.598	-2.198	4.829	2.198
216	0	86.537	8.427	7.292	-7.292	53.180	7.292
217	0.7	86.529	4.829	4.178	-3.478	12.098	3.478
218	10.4	86.521	8.258	7.145	3.255	10.596	3.255
219	36.7	86.513	27.409	23.712	12.988	168.682	12.988
220	0.05	86.506	66.569	57.586	-57.536	3310.363	57.536
221	133	86.498	218.867	189.315	-56.315	3171.397	56.315
222	80.7	86.490	99.395	85.966	-5.266	27.735	5.266
223	59.4	86.482	91.108	78.792	-19.392	376.054	19.392
224	29.6	86.474	129.718	112.172	-82.572	6818.209	82.572
225	76.4	86.467	249.180	215.457	-139.057	19336.900	139.057
226	360.9	86.459	240.098	207.586	153.314	23505.264	153.314
227	5.7	86.451	56.153	48.545	-42.845	1835.693	42.845
228	0	86.443	8.427	7.285	-7.285	53.065	7.285
229	0.05	86.435	4.829	4.174	-4.124	17.005	4.124
230	0	86.428	8.258	7.137	-7.137	50.939	7.137
231	2	86.420	27.409	23.687	-21.687	470.308	21.687
232	89.8	86.412	66.569	57.523	32.277	1041.776	32.277
233	221.8	86.404	218.867	189.110	32.690	1068.616	32.690
234	28.5	86.396	99.395	85.873	-57.373	3291.700	57.373
235	19	86.389	91.108	78.707	-59.707	3564.906	59.707
236	74	86.381	129.718	112.051	-38.051	1447.881	38.051
237	175.8	86.373	249.180	215.224	-39.424	1554.248	39.424
238	297.5	86.365	240.098	207.361	90.139	8125.039	90.139
239	19.8	86.357	56.153	48.492	-28.692	823.255	28.692
240	0	86.350	8.427	7.277	-7.277	52.950	7.277
241	0.5	86.342	4.829	4.169	-3.669	13.463	3.669
242	0	86.334	8.258	7.129	-7.129	50.829	7.129
243	2.4	86.326	27.409	23.661	-21.261	452.027	21.261
244	54.3	86.318	66.569	57.461	-3.161	9.993	3.161

ตาราง 3.9 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
245	40.7	86.311	218.867	188.905	-148.205	21964.853	148.205
246	149.9	86.303	99.395	85.780	64.120	4111.336	64.120
247	57.6	86.295	91.108	78.622	-21.022	441.906	21.022
248	160.3	86.287	129.718	111.930	48.370	2339.694	48.370
249	94.6	86.279	249.180	214.991	-120.391	14493.925	120.391
250	316.4	86.272	240.098	207.136	109.264	11938.563	109.264
251	15.8	86.264	56.153	48.440	-32.640	1065.361	32.640
252	5.7	86.256	8.427	7.269	-1.569	2.461	1.569
253	7.5	86.248	4.829	4.165	3.335	11.124	3.335
254	90.9	86.240	8.258	7.122	83.778	7018.804	83.778
255	0	86.233	27.409	23.635	-23.635	558.627	23.635
256	22.7	86.225	66.569	57.399	-34.699	1204.009	34.699
257	6.6	86.217	218.867	188.701	-182.101	33160.622	182.101
258	75.7	86.209	99.395	85.687	-9.987	99.746	9.987
259	202.1	86.201	91.108	78.536	123.564	15267.992	123.564
260	111.1	86.194	129.718	111.808	-0.708	0.502	0.708
261	234.4	86.186	249.180	214.757	19.643	385.828	19.643
262	230.8	86.178	240.098	206.912	23.888	570.659	23.888
263	1.4	86.170	56.153	48.387	-46.987	2207.807	46.987
264	63.7	86.162	8.427	7.261	56.439	3185.371	56.439
265	0	86.155	4.829	4.160	-4.160	17.307	4.160
266	0	86.147	8.258	7.114	-7.114	50.609	7.114
267	22.9	86.139	27.409	23.610	-0.710	0.504	0.710
268	119.4	86.131	66.569	57.337	62.063	3851.875	62.063
269	133.5	86.123	218.867	188.496	-54.996	3024.530	54.996
270	5.7	86.116	99.395	85.594	-79.894	6383.089	79.894
271	49.6	86.108	91.108	78.451	-28.851	832.381	28.851
272	71.1	86.100	129.718	111.687	-40.587	1647.287	40.587
273	213.3	86.092	249.180	214.524	-1.224	1.499	1.224
274	152.5	86.084	240.098	206.687	-54.187	2936.210	54.187
275	0	86.077	56.153	48.335	-48.335	2336.248	48.335
276	0	86.069	8.427	7.253	-7.253	52.606	7.253
277	0	86.061	4.829	4.156	-4.156	17.269	4.156
278	0	86.053	8.258	7.106	-7.106	50.499	7.106
279	36.8	86.045	27.409	23.584	13.216	174.663	13.216
280	74.2	86.038	66.569	57.274	16.926	286.482	16.926

ตาราง 3.9 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
281	363.1	86.030	218.867	188.291	174.809	30558.234	174.809
282	105.2	86.022	99.395	85.501	19.699	388.043	19.699
283	71.1	86.014	91.108	78.366	-7.266	52.791	7.266
284	134.1	86.006	129.718	111.565	22.535	507.810	22.535
285	34.6	85.999	249.180	214.291	-179.691	32288.864	179.691
286	118.8	85.991	240.098	206.462	-87.662	7684.639	87.662
287	6.4	85.983	56.153	48.282	-41.882	1754.118	41.882
288	0	85.975	8.427	7.245	-7.245	52.492	7.245
289	0.05	85.967	4.829	4.151	-4.101	16.819	4.101
290	0	85.960	8.258	7.099	-7.099	50.389	7.099
291	15.8	85.952	27.409	23.558	-7.758	60.192	7.758
292	61.3	85.944	66.569	57.212	4.088	16.713	4.088
293	177.2	85.936	218.867	188.086	-10.886	118.505	10.886
294	55.5	85.928	99.395	85.408	-29.908	894.499	29.908
295	76.1	85.921	91.108	78.280	-2.180	4.754	2.180
296	117.2	85.913	129.718	111.444	5.756	33.132	5.756
297	234.5	85.905	249.180	214.058	20.442	417.884	20.442
298	105.3	85.897	240.098	206.237	-100.937	10188.347	100.937
299	28.2	85.889	56.153	48.230	-20.030	401.186	20.030
300	0	85.882	8.427	7.237	-7.237	52.378	7.237
301	0	85.874	4.829	4.147	-4.147	17.194	4.147
302	30.6	85.866	8.258	7.091	23.509	552.683	23.509
303	44	85.858	27.409	23.533	20.467	418.912	20.467
304	155.6	85.850	66.569	57.150	98.450	9692.482	98.450
305	228.5	85.843	218.867	187.881	40.619	1649.891	40.619
306	250.2	85.835	99.395	85.315	164.885	27187.019	164.885
307	138.6	85.827	91.108	78.195	60.405	3648.743	60.405
308	167.1	85.819	129.718	111.323	55.777	3111.125	55.777
309	375.9	85.811	249.180	213.825	162.075	26268.449	162.075
310	81.2	85.804	240.098	206.013	-124.813	15578.188	124.813
311	77.2	85.796	56.153	48.177	29.023	842.330	29.023
312	0.05	85.788	8.427	7.229	-7.179	51.543	7.179
313	0	85.780	4.829	4.142	-4.142	17.157	4.142
314	0	85.772	8.258	7.083	-7.083	50.170	7.083
315	44.3	85.765	27.409	23.507	20.793	432.348	20.793
316	74.9	85.757	66.569	57.087	17.813	317.293	17.813

ตาราง 3.9 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
317	65.4	85.749	218.867	187.676	-122.276	14951.490	122.276
318	17.5	85.741	99.395	85.222	-67.722	4586.283	67.722
319	90.9	85.733	91.108	78.110	12.790	163.587	12.790
320	221.5	85.726	129.718	111.201	110.299	12165.843	110.299
321	204.2	85.718	249.180	213.591	-9.391	88.197	9.391
322	63.6	85.710	240.098	205.788	-142.188	20217.393	142.188
323	17.3	85.702	56.153	48.125	-30.825	950.150	30.825
324	0	85.694	8.427	7.221	-7.221	52.150	7.221
325	0	85.687	4.829	4.138	-4.138	17.119	4.138
326	0	85.679	8.258	7.075	-7.075	50.060	7.075
327	0	85.671	27.409	23.481	-23.481	551.374	23.481
328	0.05	85.663	66.569	57.025	-56.975	3246.148	56.975
329	90.1	85.655	218.867	187.471	-97.371	9481.195	97.371
330	56.1	85.648	99.395	85.129	-29.029	842.687	29.029
331	84.1	85.640	91.108	78.025	6.075	36.910	6.075
332	110.8	85.632	129.718	111.080	-0.280	0.078	0.280
333	225.2	85.624	249.180	213.358	11.842	140.231	11.842
334	153.2	85.616	240.098	205.563	-52.363	2741.899	52.363
335	42.1	85.609	56.153	48.072	-5.972	35.664	5.972
336	1.9	85.601	8.427	7.214	-5.314	28.234	5.314
337	0.9	85.593	4.829	4.133	-3.233	10.453	3.233
338	9.1	85.585	8.258	7.068	2.032	4.131	2.032
339	2.8	85.577	27.409	23.456	-20.656	426.658	20.656
340	179.1	85.570	66.569	56.963	122.137	14917.527	122.137
341	315.2	85.562	218.867	187.267	127.933	16366.963	127.933
342	60.6	85.554	99.395	85.036	-24.436	597.120	24.436
343	36.1	85.546	91.108	77.939	-41.839	1750.531	41.839
344	104.8	85.538	129.718	110.958	-6.158	37.925	6.158
345	178.6	85.531	249.180	213.125	-34.525	1191.966	34.525
346	264.4	85.523	240.098	205.338	59.062	3488.271	59.062
347	42.7	85.515	56.153	48.019	-5.319	28.296	5.319
348	6.4	85.507	8.427	7.206	-0.806	0.649	0.806
349	0	85.499	4.829	4.129	-4.129	17.045	4.129
350	30.8	85.492	8.258	7.060	23.740	563.594	23.740
351	7.3	85.484	27.409	23.430	-16.130	260.178	16.130
352	178.7	85.476	66.569	56.900	121.800	14835.152	121.800

ตาราง 3.9 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
353	286.4	85.468	218.867	187.062	99.338	9868.096	99.338
354	101.2	85.460	99.395	84.943	16.257	264.290	16.257
355	19.4	85.453	91.108	77.854	-58.454	3416.878	58.454
356	150.2	85.445	129.718	110.837	39.363	1549.456	39.363
357	247.6	85.437	249.180	212.892	34.708	1204.671	34.708
358	324.8	85.429	240.098	205.114	119.686	14324.814	119.686
359	7.4	85.421	56.153	47.967	-40.567	1645.668	40.567
360	0	85.414	8.427	7.198	-7.198	51.808	7.198
361	0	85.406	4.829	4.124	-4.124	17.007	4.124
362	0	85.398	8.258	7.052	-7.052	49.733	7.052
363	193.8	85.390	27.409	23.404	170.396	29034.664	170.396
364	0	85.382	66.569	56.838	-56.838	3230.564	56.838
365	398.7	85.375	218.867	186.857	211.843	44877.521	211.843
366	30.2	85.367	99.395	84.850	-54.650	2986.619	54.650
367	48.8	85.359	91.108	77.769	-28.969	839.191	28.969
368	53.8	85.351	129.718	110.715	-56.915	3239.369	56.915
369	150.1	85.343	249.180	212.658	-62.558	3913.553	62.558
370	290.3	85.336	240.098	204.889	85.411	7295.047	85.411
371	22.9	85.328	56.153	47.914	-25.014	625.714	25.014
372	12.3	85.320	8.427	7.190	5.110	26.113	5.110
รวม						1313673.480	15060.469

3.2.2 วิธีเคลื่อนที่สองชั้น (Double Moving Average)

1) ค่าแนวโน้ม (T) จากที่กล่าวไว้ในบทที่ 2 (2.2.1.2) โดยการวิเคราะห์จะทำให้การเคลื่อนที่สองชั้นตั้งแต่ครั้งละ 2 ถึง 12 เดือน พบว่าการเคลื่อนที่ครั้งละ 12 เดือนทำให้ได้ค่าคลาดเคลื่อนกำลังสองเฉลี่ยน้อยที่สุด การคำนวณหาค่าแนวโน้มแสดงดังตาราง 3.10

ตาราง 3.10 แสดงการหาค่าแนวโน้มโดยวิธีเฉลี่ยเคลื่อนที่สองชั้น

เดือน	ข้อมูล Y	M_t	M_t^2	a_0	a_1	ค่าแนวโน้ม T	Y/T = SCI
1	0	*	*	*	*	*	*
2	0	*	*	*	*	*	*
3	13.7	*	*	*	*	*	*
4	14.1	*	*	*	*	*	*
5	222.7	*	*	*	*	*	*
6	55.6	*	*	*	*	*	*
7	101.4	*	*	*	*	*	*
8	194.9	*	*	*	*	*	*
9	182.1	*	*	*	*	*	*
10	210.6	*	*	*	*	*	*
11	20.4	*	*	*	*	*	*
12	18.2	86.142	*	*	*	*	*
13	0.7	86.200	*	*	*	*	*
14	3.1	86.458	*	*	*	*	*
15	7.3	85.925	*	*	*	*	*
16	74.7	90.975	*	*	*	*	*
17	112.3	81.775	*	*	*	*	*
18	73.9	83.300	*	*	*	*	*
19	68.8	80.583	*	*	*	*	*
20	47.4	68.292	*	*	*	*	*
21	380.5	84.825	*	*	*	*	*
22	208.9	84.683	*	*	*	*	*
23	107.4	91.933	84.258	99.609	1.396	*	*
24	29.8	92.900	84.821	100.979	1.469	101.005	29.504
25	0	92.842	85.374	100.309	1.358	102.448	0.000
26	0	92.583	85.885	99.282	1.218	101.667	0.000
27	123.6	102.275	87.247	117.303	2.732	100.500	122.985
28	0	96.050	87.670	104.430	1.524	120.035	0.000
29	336.4	114.725	90.416	139.034	4.420	105.953	317.498
30	140.3	120.258	93.496	147.021	4.866	143.454	97.801
31	38.7	117.750	96.593	138.907	3.847	151.887	25.480
32	119.1	123.725	101.213	146.238	4.093	142.754	83.430
33	347.9	121.008	104.228	137.789	3.051	150.331	231.423
34	243	123.850	107.492	140.208	2.974	140.840	172.536

ตาราง 3.10 (ต่อ)

เดือน	ข้อมูล Y	M_t	M_t^2	a_0	a_1	ค่าแนวโน้ม T	Y/T = SCI
35	7.6	115.533	109.458	121.608	1.105	143.183	5.308
36	0	113.050	111.138	114.963	0.348	122.713	0.000
37	0	113.050	112.822	113.278	0.042	115.310	0.000
38	0	113.050	114.527	111.573	-0.269	113.320	0.000
39	64.3	108.108	115.013	101.203	-1.255	111.304	57.770
40	123.3	118.383	116.874	119.892	0.274	99.948	123.364
41	267.8	112.667	116.703	108.631	-0.734	120.167	222.857
42	50.6	105.192	115.447	94.936	-1.865	107.897	46.897
43	90.9	109.542	114.763	104.320	-0.949	93.071	97.667
44	131	110.533	113.664	107.403	-0.569	103.371	126.728
45	267.7	103.850	112.234	95.466	-1.524	106.834	250.577
46	299.1	108.525	110.957	106.093	-0.442	93.942	318.389
47	170.2	122.075	111.502	132.648	1.922	105.651	161.097
48	3.9	122.400	112.281	132.519	1.840	134.570	2.898
49	76.6	128.783	113.592	143.974	2.762	134.359	57.012
50	0	128.783	114.903	142.663	2.524	146.736	0.000
51	0	123.425	116.180	130.670	1.317	145.187	0.000
52	3.3	113.425	115.767	111.083	-0.426	131.987	2.500
53	199.3	107.717	115.354	100.079	-1.389	110.658	180.105
54	107.1	112.425	115.957	108.893	-0.642	98.691	108.521
55	64.4	110.217	116.013	104.420	-1.054	108.251	59.491
56	87.8	106.617	115.687	97.547	-1.649	103.366	84.941
57	192.4	100.342	115.394	85.289	-2.737	95.897	200.631
58	276.8	98.483	114.558	82.409	-2.923	82.552	335.304
59	85.1	91.392	112.001	70.783	-3.747	79.486	107.062
60	33.7	93.875	109.624	78.126	-2.863	67.036	50.272
61	0	87.492	106.183	68.801	-3.398	75.263	0.000
62	0.3	87.517	102.744	72.290	-2.769	65.402	0.459
63	4.3	87.875	99.781	75.969	-2.165	69.521	6.185
64	20.9	89.342	97.774	80.909	-1.533	73.804	28.318
65	166.1	86.575	96.013	77.138	-1.716	79.376	209.258
66	85.4	84.767	93.708	75.826	-1.626	75.422	113.230

ตาราง 3.10 (ต่อ)

เดือน	ข้อมูล Y	M_t	M_t^2	a_0	a_1	ค่าแนวโน้ม T	Y/T = SCI
67	132.4	90.433	92.059	88.808	-0.296	74.200	178.437
68	169.5	97.242	91.278	103.206	1.084	88.512	191.499
69	234.1	100.717	91.309	110.124	1.710	104.290	224.470
70	280.1	100.992	91.518	110.465	1.722	111.835	250.459
71	43.7	97.542	92.031	103.053	1.002	112.188	38.953
72	30.7	97.292	92.315	102.268	0.905	104.055	29.504
73	35.9	100.283	93.381	107.185	1.255	103.173	34.796
74	0	100.258	94.443	106.074	1.057	108.440	0.000
75	46.5	103.775	95.768	111.782	1.456	107.131	43.405
76	58.2	106.883	97.230	116.537	1.755	113.238	51.396
77	103.8	101.692	98.490	104.894	0.582	118.292	87.749
78	19.6	96.208	99.443	92.974	-0.588	105.476	18.582
79	108.8	94.242	99.760	88.723	-1.003	92.385	117.767
80	60.7	85.175	98.755	71.595	-2.469	87.720	69.198
81	213.5	83.458	97.317	69.600	-2.520	69.126	308.856
82	140.5	71.825	94.886	48.764	-4.193	67.080	209.450
83	15.6	69.483	92.548	46.419	-4.194	44.571	35.000
84	0.8	66.992	90.023	43.960	-4.188	42.225	1.895
85	7.8	64.650	87.053	42.247	-4.073	39.773	19.611
86	23.9	66.642	84.252	49.031	-3.202	38.173	62.609
87	0	62.767	80.835	44.699	-3.285	45.829	0.000
88	8.6	58.633	76.814	40.453	-3.306	41.414	20.766
89	273.7	72.792	74.406	71.178	-0.293	37.147	736.798
90	53.8	75.642	72.692	78.592	0.536	70.884	75.898
91	272.2	89.258	72.276	106.240	3.088	79.128	343.999
92	40.4	87.567	72.476	102.658	2.744	109.328	36.953
93	248	90.442	73.058	107.826	3.161	105.401	235.291
94	108.9	87.808	74.390	101.227	2.440	110.986	98.120
95	0	86.508	75.808	97.208	1.945	103.667	0.000
96	0	86.442	77.429	95.454	1.639	99.154	0.000
97	0	85.792	79.191	92.392	1.200	97.093	0.000
98	0	83.800	80.621	86.979	0.578	93.592	0.000

ตาราง 3.10 (ต่อ)

เดือน	ข้อมูล Y	M_t	M_t^2	a_0	a_1	ค่าแนวโน้ม T	Y/T = SCI
99	0	83.800	82.374	85.226	0.259	87.557	0.000
100	39.4	86.367	84.685	88.049	0.306	85.486	46.090
101	156.5	76.600	85.002	68.198	-1.528	88.354	177.128
102	111.6	81.417	85.483	77.350	-0.739	66.670	167.391
103	44.8	62.467	83.251	41.683	-3.779	76.611	58.478
104	89.8	66.583	81.502	51.665	-2.713	37.904	236.916
105	362.1	76.092	80.306	71.877	-0.766	48.952	739.703
106	33.6	69.817	78.807	60.826	-1.635	71.111	47.250
107	0	69.817	77.416	62.217	-1.382	59.192	0.000
108	0	69.817	76.031	63.603	-1.130	60.836	0.000
109	0	69.817	74.699	64.934	-0.888	62.473	0.000
110	0	69.817	73.534	66.099	-0.676	64.046	0.000
111	37.2	72.917	72.627	73.206	0.053	65.423	56.860
112	19.1	71.225	71.365	71.085	-0.026	73.259	26.072
113	277.7	81.325	71.759	90.891	1.739	71.059	390.801
114	52.2	76.375	71.339	81.411	0.916	92.630	56.353
115	66.1	78.150	72.646	83.654	1.001	82.327	80.290
116	156	83.667	74.069	93.264	1.745	84.655	184.278
117	297.9	78.317	74.255	82.378	0.739	95.009	313.550
118	185.7	90.992	76.019	105.964	2.722	83.117	223.420
119	71.1	96.917	78.278	115.556	3.389	108.686	65.418
120	0	96.917	80.536	113.297	2.978	118.944	0.000
121	0	96.917	82.794	111.039	2.568	116.276	0.000
122	0.05	96.921	85.053	108.789	2.158	113.607	0.044
123	0.3	93.846	86.797	100.894	1.282	110.946	0.270
124	123.1	102.513	89.405	115.620	2.383	102.176	120.478
125	234.7	98.929	90.872	106.987	1.465	118.004	198.892
126	77.4	101.029	92.926	109.132	1.473	108.452	71.368
127	72.7	101.579	94.878	108.280	1.218	110.606	65.729
128	78.8	95.146	95.835	94.457	-0.125	109.498	71.965
129	90.6	77.871	95.798	59.944	-3.259	94.331	96.044
130	112	71.729	94.193	49.266	-4.084	56.684	197.586

ตาราง 3.10 (ต่อ)

เดือน	ข้อมูล Y	M_t	M_t^2	a_0	a_1	ค่าแนวโน้ม T	Y/T = SCI
131	217.2	83.904	93.108	74.700	-1.673	45.181	480.729
132	0	83.904	92.024	75.784	-1.476	73.027	0.000
133	0.05	83.908	90.940	76.877	-1.278	74.308	0.067
134	0	83.904	89.855	77.953	-1.082	75.598	0.000
135	2.6	84.096	89.043	79.149	-0.899	76.871	3.382
136	28.6	76.221	86.852	65.590	-1.933	78.250	36.550
137	197.4	73.113	84.700	61.525	-2.107	63.657	310.099
138	91.4	74.279	82.471	66.087	-1.489	59.418	153.826
139	38.9	71.463	79.961	62.964	-1.545	64.598	60.219
140	62.3	70.088	77.873	62.302	-1.416	61.418	101.436
141	113.2	71.971	77.382	66.560	-0.984	60.886	185.921
142	182.4	77.838	77.891	77.784	-0.010	65.576	278.149
143	18.6	61.288	76.006	46.569	-2.676	77.775	23.915
144	0	61.288	74.121	48.454	-2.333	43.893	0.000
145	0.4	61.317	72.239	50.395	-1.986	46.120	0.867
146	0	61.317	70.356	52.277	-1.644	48.409	0.000
147	0.05	61.104	68.440	53.768	-1.334	50.634	0.099
148	0.6	58.771	66.986	50.556	-1.494	52.434	1.144
149	175.2	56.921	65.637	48.205	-1.585	49.062	357.100
150	98.9	57.546	64.242	50.849	-1.218	46.620	212.140
151	59.7	59.279	63.227	55.331	-0.718	49.632	120.286
152	188.9	69.829	63.206	76.453	1.204	54.613	345.886
153	169	74.479	63.415	85.544	2.012	77.657	217.623
154	289	83.363	63.875	102.850	3.543	87.555	330.076
155	214	99.646	67.072	132.220	5.923	106.393	201.141
156	14.1	100.821	70.366	131.276	5.537	138.143	10.207
157	0.05	100.792	73.656	127.928	4.934	136.813	0.037
158	21.7	102.600	77.096	128.104	4.637	132.862	16.333
159	0	102.596	80.553	124.638	4.008	132.741	0.000
160	43.2	106.146	84.501	127.790	3.935	128.646	33.581
161	116.4	101.246	88.195	114.297	2.373	131.726	88.365
162	106.8	101.904	91.892	111.917	1.820	116.669	91.541

ตาราง 3.10 (ต่อ)

เดือน	ข้อมูล Y	M_t	M_t^2	a_0	a_1	ค่าแนวโน้ม T	Y/T = SCI
163	60.9	102.004	95.452	108.556	1.191	113.737	53.545
164	71.7	92.238	97.319	87.156	-0.924	109.748	65.332
165	214.6	96.038	99.116	92.959	-0.560	86.232	248.865
166	248.7	92.679	99.892	85.466	-1.311	92.399	269.158
167	2.6	75.063	97.844	52.281	-4.142	84.154	3.090
168	0	73.888	95.599	52.176	-3.948	48.139	0.000
169	0	73.883	93.357	54.410	-3.541	48.228	0.000
170	0	72.075	90.813	53.337	-3.407	50.869	0.000
171	0.8	72.142	88.275	56.008	-2.933	49.930	1.602
172	40.4	71.908	85.422	58.394	-2.457	53.075	76.119
173	148.4	74.575	83.200	65.950	-1.568	55.937	265.297
174	59.9	70.667	80.597	60.737	-1.805	64.382	93.038
175	61.5	70.717	77.989	63.444	-1.322	58.931	104.359
176	37.7	67.883	75.960	59.807	-1.468	62.122	60.687
177	307.3	75.608	74.257	76.959	0.246	58.339	526.753
178	194.2	71.067	72.456	69.677	-0.253	77.205	251.538
179	118.2	80.700	72.926	88.474	1.413	69.424	170.257
180	0	80.700	73.494	87.906	1.310	89.887	0.000
181	0	80.700	74.062	87.338	1.207	89.216	0.000
182	0	80.700	74.781	86.619	1.076	88.545	0.000
183	0.05	80.638	75.489	85.786	0.936	87.696	0.057
184	35	80.188	76.178	84.197	0.729	86.723	40.359
185	196.3	84.179	76.979	91.380	1.309	84.925	231.144
186	57.7	83.996	78.090	89.902	1.074	92.689	62.251
187	21.8	80.688	78.920	82.455	0.321	90.976	23.962
188	120.3	87.571	80.561	94.581	1.274	82.776	145.332
189	228.6	81.013	81.011	81.014	0.000	95.855	238.485
190	128.8	75.563	81.386	69.739	-1.059	81.014	158.985
191	0.2	65.729	80.139	51.320	-2.620	68.680	0.291
192	6.1	66.238	78.933	53.542	-2.308	48.700	12.526
193	0	66.238	77.728	54.747	-2.089	51.233	0.000
194	0	66.238	76.523	55.952	-1.870	52.658	0.000

ตาราง 3.10 (ต่อ)

เดือน	ข้อมูล Y	M_t	M_t^2	a_0	a_1	ค่าแนวโน้ม T	Y/T = SCI
195	26.4	68.433	75.506	61.361	-1.286	54.082	48.815
196	72.6	71.567	74.788	68.346	-0.586	60.075	120.849
197	73.3	61.317	72.882	49.751	-2.103	67.760	108.176
198	169.6	70.642	71.769	69.514	-0.205	47.648	355.942
199	15.6	70.125	70.889	69.361	-0.139	69.309	22.508
200	256.5	81.475	70.381	92.569	2.017	69.222	370.548
201	229.4	81.542	70.425	92.658	2.021	94.586	242.531
202	139.5	82.433	70.998	93.869	2.079	94.679	147.340
203	89.5	89.875	73.010	106.740	3.066	95.948	93.280
204	0	89.367	74.938	103.796	2.623	109.806	0.000
205	0	89.367	76.865	101.868	2.273	106.419	0.000
206	0.1	89.375	78.793	99.957	1.924	104.141	0.096
207	0	87.175	80.355	93.995	1.240	101.881	0.000
208	69.8	86.942	81.636	92.247	0.965	95.235	73.292
209	168.5	94.875	84.433	105.317	1.899	93.212	180.771
210	244.3	101.100	86.971	115.229	2.569	107.216	227.858
211	180.3	114.825	90.696	138.954	4.387	117.798	153.058
212	68.4	99.150	92.169	106.131	1.269	143.341	47.718
213	183.2	95.300	93.315	97.285	0.361	107.401	170.576
214	414.1	118.183	96.294	140.072	3.980	97.646	424.085
215	46.4	114.592	98.354	130.829	2.952	144.052	32.211
216	0	114.592	100.456	128.727	2.570	133.781	0.000
217	0.7	114.650	102.563	126.737	2.198	131.297	0.533
218	10.4	115.508	104.741	126.276	1.958	128.934	8.066
219	36.7	118.567	107.357	129.776	2.038	128.233	28.620
220	0.05	112.754	109.508	116.000	0.590	131.815	0.038
221	133	109.796	110.751	108.840	-0.174	116.591	114.074
222	80.7	96.163	110.340	81.985	-2.578	108.667	74.264
223	59.4	86.088	107.945	64.230	-3.974	79.407	74.804
224	29.6	82.854	106.587	59.121	-4.315	60.256	49.124
225	76.4	73.954	104.808	43.100	-5.610	54.806	139.401
226	360.9	69.521	100.753	38.289	-5.679	37.490	962.653

ตาราง 3.10 (ต่อ)

เดือน	ข้อมูล Y	M_t	M_t^2	a_0	a_1	ค่าแนวโน้ม T	Y/T = SCI
227	5.7	66.129	96.715	35.544	-5.561	32.610	17.479
228	0	66.129	92.676	39.582	-4.827	29.983	0.000
229	0.05	66.075	88.628	43.522	-4.101	34.756	0.144
230	0	65.208	84.436	45.980	-3.496	39.421	0.000
231	2	62.317	79.749	44.884	-3.170	42.484	4.708
232	89.8	69.796	76.169	63.423	-1.159	41.715	215.271
233	221.8	77.196	73.452	80.939	0.681	62.264	356.226
234	28.5	72.846	71.509	74.182	0.243	81.620	34.918
235	19	69.479	70.125	68.833	-0.117	74.425	25.529
236	74	73.179	69.319	77.039	0.702	68.715	107.690
237	175.8	81.463	69.945	92.980	2.094	77.741	226.135
238	297.5	76.179	70.500	81.859	1.033	95.074	312.913
239	19.8	77.354	71.435	83.273	1.076	82.891	23.887
240	0	77.354	72.370	82.338	0.906	84.349	0.000
241	0.5	77.392	73.314	81.470	0.741	83.244	0.601
242	0	77.392	74.329	80.455	0.557	82.211	0.000
243	2.4	77.425	75.588	79.262	0.334	81.011	2.963
244	54.3	74.467	75.977	72.956	-0.275	79.596	68.219
245	40.7	59.375	74.492	44.258	-2.749	72.682	55.998
246	149.9	69.492	74.213	64.771	-0.858	41.509	361.123
247	57.6	72.708	74.482	70.935	-0.322	63.913	90.123
248	160.3	79.900	75.042	84.758	0.883	70.613	227.013
249	94.6	73.133	74.348	71.919	-0.221	85.642	110.460
250	316.4	74.708	74.225	75.192	0.088	71.698	441.293
251	15.8	74.375	73.977	74.773	0.072	75.280	20.988
252	5.7	74.850	73.768	75.932	0.197	74.846	7.616
253	7.5	75.433	73.605	77.262	0.332	76.129	9.852
254	90.9	83.008	74.073	91.944	1.625	77.594	117.148
255	0	82.808	74.522	91.095	1.507	93.568	0.000
256	22.7	80.175	74.997	85.353	0.941	92.602	24.514
257	6.6	77.333	76.494	78.173	0.153	86.294	7.648
258	75.7	71.150	76.632	65.668	-0.997	78.326	96.648

ตาราง 3.10 (ต่อ)

เดือน	ข้อมูล Y	M_t	M_t^2	a_0	a_1	ค่าแนวโน้ม T	Y/T = SCI
259	202.1	83.192	77.506	88.878	1.034	64.671	312.503
260	111.1	79.092	77.438	80.745	0.301	89.912	123.566
261	234.4	90.742	78.906	102.578	2.152	81.046	289.219
262	230.8	83.608	79.647	87.569	0.720	104.730	220.377
263	1.4	82.408	80.317	84.500	0.380	88.290	1.586
264	63.7	87.242	81.349	93.134	1.071	84.880	75.047
265	0	86.617	82.281	90.952	0.788	94.205	0.000
266	0	79.042	81.951	76.133	-0.529	91.740	0.000
267	22.9	80.950	81.796	80.104	-0.154	75.604	30.290
268	119.4	89.008	82.532	95.485	1.178	79.950	149.343
269	133.5	99.583	84.386	114.781	2.763	96.662	138.110
270	5.7	93.750	86.269	101.231	1.360	117.544	4.849
271	49.6	81.042	86.090	75.993	-0.918	102.591	48.347
272	71.1	77.708	85.975	69.442	-1.503	75.075	94.705
273	213.3	75.950	84.742	67.158	-1.599	67.939	313.960
274	152.5	69.425	83.560	55.290	-2.570	65.559	232.615
275	0	69.308	82.469	56.148	-2.393	52.720	0.000
276	0	64.000	80.532	47.468	-3.006	53.755	0.000
277	0	64.000	78.647	49.353	-2.663	44.462	0.000
278	0	64.000	77.394	50.606	-2.435	46.690	0.000
279	36.8	65.158	76.078	54.239	-1.985	48.171	76.394
280	74.2	61.392	73.776	49.007	-2.252	52.254	142.000
281	363.1	80.525	72.188	88.862	1.516	46.755	776.598
282	105.2	88.817	71.777	105.856	3.098	90.378	116.401
283	71.1	90.608	72.574	108.642	3.279	108.954	65.257
284	134.1	95.858	74.087	117.630	3.958	111.921	119.816
285	34.6	80.967	74.505	87.428	1.175	121.588	28.457
286	118.8	78.158	75.233	81.084	0.532	88.603	134.081
287	6.4	78.692	76.015	81.369	0.487	81.616	7.842
288	0	78.692	77.239	80.144	0.264	81.855	0.000
289	0.05	78.696	78.464	78.928	0.042	80.409	0.062
290	0	78.696	79.688	77.703	-0.180	78.970	0.000

ตาราง 3.10 (ต่อ)

เดือน	ข้อมูล Y	M_t	M_t^2	a_0	a_1	ค่าแนวโน้ม T	Y/T = SCI
291	15.8	76.946	80.670	73.221	-0.677	77.523	20.381
292	61.3	75.871	81.877	69.865	-1.092	72.544	84.500
293	177.2	60.379	80.198	40.560	-3.603	68.773	257.661
294	55.5	56.238	77.483	34.992	-3.863	36.957	150.176
295	76.1	56.654	74.654	38.655	-3.273	31.129	244.468
296	117.2	55.246	71.269	39.222	-2.913	35.382	331.243
297	234.5	71.904	70.514	73.294	0.253	36.309	645.848
298	105.3	70.779	69.899	71.659	0.160	73.547	143.174
299	28.2	72.596	69.391	75.800	0.583	71.819	39.265
300	0	72.596	68.883	76.308	0.675	76.383	0.000
301	0	72.592	68.375	76.809	0.767	76.983	0.000
302	30.6	75.142	68.078	82.205	1.284	77.575	39.445
303	44	77.492	68.124	86.859	1.703	83.489	52.702
304	155.6	85.350	68.914	101.786	2.988	88.563	175.695
305	228.5	89.625	71.351	107.899	3.323	104.774	218.087
306	250.2	105.850	75.485	136.215	5.521	111.221	224.957
307	138.6	111.058	80.019	142.098	5.643	141.735	97.788
308	167.1	115.217	85.017	145.417	5.491	147.741	113.103
309	375.9	127.000	89.608	164.392	6.799	150.908	249.093
310	81.2	124.992	94.126	155.858	5.612	171.191	47.433
311	77.2	129.075	98.832	159.318	5.499	161.470	47.811
312	0.05	129.079	103.539	154.619	4.644	164.816	0.030
313	0	129.079	108.247	149.912	3.788	159.263	0.000
314	0	126.529	112.529	140.530	2.546	153.700	0.000
315	44.3	126.554	116.617	136.491	1.807	143.075	30.963
316	74.9	119.829	119.491	120.168	0.062	138.298	54.159
317	65.4	106.238	120.875	91.600	-2.661	120.229	54.396
318	17.5	86.846	119.291	54.400	-5.899	88.939	19.676
319	90.9	82.871	116.942	48.799	-6.195	48.501	187.418
320	221.5	87.404	114.625	60.184	-4.949	42.604	519.898
321	204.2	73.096	110.133	36.059	-6.734	55.235	369.696
322	63.6	71.629	105.686	37.573	-6.192	29.325	216.879
323	17.3	66.638	100.483	32.792	-6.154	31.380	55.130

ตาราง 3.10 (ต่อ)

เดือน	ข้อมูล Y	M_t	M_t^2	a_0	a_1	ค่าแนวโน้ม T	Y/T = SCI
324	0	66.633	95.279	37.988	-5.208	26.639	0.000
325	0	66.633	90.075	43.192	-4.262	32.780	0.000
326	0	66.633	85.084	48.183	-3.355	38.930	0.000
327	0	62.942	79.783	46.101	-3.062	44.828	0.000
328	0.05	56.704	74.522	38.886	-3.240	43.039	0.116
329	90.1	58.763	70.566	46.959	-2.146	35.646	252.760
330	56.1	61.979	68.494	55.465	-1.184	44.813	125.187
331	84.1	61.413	66.706	56.119	-0.962	54.280	154.937
332	110.8	52.188	63.771	40.604	-2.106	55.157	200.881
333	225.2	53.938	62.174	45.701	-1.498	38.498	584.964
334	153.2	61.404	61.322	61.486	0.015	44.203	346.582
335	42.1	63.471	61.058	65.883	0.439	61.501	68.454
336	1.9	63.629	60.808	66.450	0.513	66.322	2.865
337	0.9	63.704	60.564	66.844	0.571	66.963	1.344
338	9.1	64.463	60.383	68.542	0.742	67.415	13.498
339	2.8	64.696	60.529	68.863	0.758	69.284	4.041
340	179.1	79.617	62.439	96.795	3.123	69.620	257.253
341	315.2	98.375	65.740	131.010	5.934	99.918	315.458
342	60.6	98.750	68.804	128.696	5.445	136.944	44.252
343	36.1	94.750	71.582	117.918	4.212	134.141	26.912
344	104.8	94.250	75.087	113.413	3.484	122.130	85.810
345	178.6	90.367	78.123	102.610	2.226	116.897	152.784
346	264.4	99.633	81.309	117.958	3.332	104.837	252.202
347	42.7	99.683	84.326	115.040	2.792	121.290	35.205
348	6.4	100.058	87.362	112.755	2.308	117.832	5.431
349	0	99.983	90.385	109.581	1.745	115.063	0.000
350	30.8	101.792	93.496	110.087	1.508	111.326	27.666
351	7.3	102.167	96.619	107.715	1.009	111.595	6.541
352	178.7	102.133	98.495	105.772	0.661	108.723	164.362
353	286.4	99.733	98.608	100.858	0.205	106.433	269.089
354	101.2	103.117	98.972	107.261	0.754	101.063	100.136
355	19.4	101.725	99.553	103.897	0.395	108.015	17.961
356	150.2	105.508	100.492	110.525	0.912	104.291	144.020

ตาราง 3.10 (ต่อ)

เดือน	ข้อมูล Y	M_t	M_t^2	a_0	a_1	ค่าแนวโน้ม T	Y/T = SCI
357	247.6	111.258	102.233	120.284	1.641	111.437	222.188
358	324.8	116.292	103.621	128.963	2.304	121.925	266.393
359	7.4	113.350	104.760	121.940	1.562	131.266	5.637
360	0	112.817	105.823	119.810	1.272	123.502	0.000
361	0	112.817	106.892	118.741	1.077	121.082	0.000
362	0	110.250	107.597	112.903	0.482	119.818	0.000
363	193.8	125.792	109.566	142.017	2.950	113.385	170.922
364	0	110.900	110.297	111.503	0.110	144.967	0.000
365	398.7	120.258	112.007	128.510	1.500	111.613	357.216
366	30.2	114.342	112.942	115.741	0.254	130.010	23.229
367	48.8	116.792	114.198	119.385	0.472	115.995	42.071
368	53.8	108.758	114.469	103.048	-1.038	119.857	44.887
369	150.1	100.633	113.583	87.683	-2.355	102.010	147.143
370	290.3	97.758	112.039	83.478	-2.596	85.329	340.213
371	22.9	99.050	110.847	87.253	-2.145	80.881	28.313
372	12.3	100.075	109.785	90.365	-1.766	85.108	14.452

2) ดัชนีฤดูกาล (Seasonal Index)

ในการคำนวณค่าดัชนีฤดูกาลจะใช้วิธีอัตราส่วนต่อค่าแนวโน้ม จากการหาค่าแนวโน้มโดยวิธีเฉลี่ยเคลื่อนที่สองชั้น ดังตาราง 3.10 เมื่อทำการหาค่าแนวโน้มโดยการหารข้อมูลจริงด้วยค่าแนวโน้ม (Y/T) จะได้ค่า SCI และใช้ SCI นี้ไปหาดัชนีฤดูกาล ดังตาราง 3.11

จะเห็นว่าเมื่อนำค่าดัชนีฤดูกาลของทุกเดือนมารวมกันจะได้เท่ากับ 1,200 เพราะเป็นค่าดัชนีฤดูกาลที่ปรับแล้ว (normalized seasonal index) เนื่องจากเรากำหนดค่าดัชนีฤดูกาลในรูปแบบเปอร์เซ็นต์ นั่นหมายถึง ถ้าปริมาณน้ำฝนในเดือนใดมีค่าดัชนีฤดูกาลเท่ากับ 100 แสดงว่าไม่มีอิทธิพลของฤดูกาลต่อปริมาณน้ำฝน แต่ถ้าค่าดัชนีฤดูกาลในเดือนใดมีค่ามากกว่า 100 แสดงว่าอิทธิพลของฤดูกาลต่อปริมาณน้ำฝนในเดือนนั้นสูงกว่าปริมาณน้ำฝนเฉลี่ย และถ้าค่าดัชนีฤดูกาลใดมีค่าน้อยกว่า 100 แสดงว่าอิทธิพลของฤดูกาลในเดือนนั้นทำให้ปริมาณน้ำฝนต่ำกว่าปริมาณน้ำฝนเฉลี่ย

ตาราง 3.11 แสดงค่าดัชนีฤดูกาล

ปี	เดือน											
	ม.ค.	ก.พ.	มี.ค.	เม.ย.	พ.ค.	มิ.ย.	ก.ค.	ส.ค.	ก.ย.	ต.ค.	พ.ย.	ธ.ค.
2514	*	*	*	*	*	*	*	*	*	*	*	*
2515	*	*	*	*	*	*	*	*	*	*	*	29.504
2516	0.000	0.000	122.985	0.000	317.498	97.801	25.480	83.430	231.423	172.536	5.308	0.000
2517	0.000	0.000	57.770	123.364	222.857	46.897	97.667	126.728	250.577	318.389	161.097	2.898
2518	57.012	0.000	0.000	2.500	180.105	108.521	59.491	84.941	200.631	335.304	107.062	50.272
2519	0.000	0.459	6.185	28.318	209.258	113.230	178.437	191.499	224.470	250.459	38.953	29.504
2520	34.796	0.000	43.405	51.396	87.749	18.582	117.767	69.198	308.856	209.450	35.000	1.895
2521	19.611	62.609	0.000	20.766	736.798	75.898	343.999	36.953	235.291	98.120	0.000	0.000
2522	0.000	0.000	0.000	46.090	177.128	167.391	58.478	236.916	739.703	47.250	0.000	0.000
2523	0.000	0.000	56.860	26.072	390.801	56.353	80.290	184.278	313.550	223.420	65.418	0.000
2524	0.000	0.044	0.270	120.478	198.892	71.368	65.729	71.965	96.044	197.586	480.729	0.000
2525	0.067	0.000	3.382	36.550	310.099	153.826	60.219	101.436	185.921	278.149	23.915	0.000
2526	0.867	0.000	0.099	1.144	357.100	212.140	120.286	345.886	217.623	330.076	201.141	10.207
2527	0.037	16.333	0.000	33.581	88.365	91.541	53.545	65.332	248.865	269.158	3.090	0.000
2528	0.000	0.000	1.602	76.119	265.297	93.038	104.359	60.687	526.753	251.538	170.257	0.000
2529	0.000	0.000	0.057	40.359	231.144	62.251	23.962	145.332	238.485	158.985	0.291	12.526
2530	0.000	0.000	48.815	120.849	108.176	355.942	22.508	370.548	242.531	147.340	93.280	0.000
2531	0.000	0.096	0.000	73.292	180.771	227.858	153.058	47.718	170.576	424.085	32.211	0.000
2532	0.533	8.066	28.620	0.038	114.074	74.264	74.804	49.124	139.401	962.653	17.479	0.000
2533	0.144	0.000	4.708	215.271	356.226	34.918	25.529	107.690	226.135	312.913	23.887	0.000
2534	0.601	0.000	2.963	68.219	55.998	361.123	90.123	227.013	110.460	441.293	20.988	7.616
2535	9.852	117.148	0.000	24.514	7.648	96.648	312.503	123.566	289.219	220.377	1.586	75.047
2536	0.000	0.000	30.290	149.343	138.110	4.849	48.347	94.705	313.960	232.615	0.000	0.000
2537	0.000	0.000	76.394	142.000	776.598	116.401	65.257	119.816	28.457	134.081	7.842	0.000
2538	0.062	0.000	20.381	84.500	257.661	150.176	244.468	331.243	645.848	143.174	39.265	0.000
2539	0.000	39.445	52.702	175.695	218.087	224.957	97.788	113.103	249.093	47.433	47.811	0.030
2540	0.000	0.000	30.963	54.159	54.396	19.676	187.418	519.898	369.696	216.879	55.130	0.000
2541	0.000	0.000	0.000	0.116	252.760	125.187	154.937	200.881	584.964	346.582	68.454	2.865
2542	1.344	13.498	4.041	257.253	315.458	44.252	26.912	85.810	152.784	252.202	35.205	5.431
2543	0.000	27.666	6.541	164.362	269.089	100.136	17.961	144.020	222.188	266.393	5.637	0.000
2544	0.000	0.000	170.922	0.000	357.216	23.229	42.071	44.887	147.143	340.213	28.313	14.452
รวม	124.926	285.365	769.955	2136.349	7235.360	3328.453	2953.393	4384.603	7910.649	7628.654	1769.348	242.246
ค่าเฉลี่ย	4.308	9.840	26.550	73.667	249.495	114.774	101.841	151.193	272.781	263.057	61.012	8.075
S	3.868	8.835	23.837	66.139	223.998	103.045	91.433	135.742	244.904	236.174	54.777	7.250

3) การพยากรณ์

จากรูปแบบของการพยากรณ์คือ $\hat{Y} = T \times S$ เมื่อได้ส่วนของค่าแนวโน้ม (T) และดัชนีฤดูกาล (S) แล้วทำการหาค่าพยากรณ์ และ ค่าความคลาดเคลื่อน ดังแสดงในตาราง 3.12 ซึ่งวิธีเฉลี่ยเคลื่อนที่สองขั้นนี้ คำนวณค่า MSE และ MAD ได้

$$MSE = 4,763.423 \quad MAD = 44.633$$

ตาราง 3.12 แสดงการพยากรณ์อนุกรมเวลาโดยวิธีเฉลี่ยเคลื่อนที่สองขั้น

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
1	0	*	*	*	*	*	*
2	0	*	*	*	*	*	*
3	13.7	*	*	*	*	*	*
4	14.1	*	*	*	*	*	*
5	222.7	*	*	*	*	*	*
6	55.6	*	*	*	*	*	*
7	101.4	*	*	*	*	*	*
8	194.9	*	*	*	*	*	*
9	182.1	*	*	*	*	*	*
10	210.6	*	*	*	*	*	*
11	20.4	*	*	*	*	*	*
12	18.2	*	*	*	*	*	*
13	0.7	*	*	*	*	*	*
14	3.1	*	*	*	*	*	*
15	7.3	*	*	*	*	*	*
16	74.7	*	*	*	*	*	*
17	112.3	*	*	*	*	*	*
18	73.9	*	*	*	*	*	*
19	68.8	*	*	*	*	*	*
20	47.4	*	*	*	*	*	*
21	380.5	*	*	*	*	*	*
22	208.9	*	*	*	*	*	*
23	107.4	*	*	*	*	*	*
24	29.8	101.005	7.250	7.322	22.478	505.239	22.478
25	0	102.448	3.868	3.962	-3.962	15.699	3.962
26	0	101.667	8.835	8.982	-8.982	80.673	8.982
27	123.6	100.500	23.837	23.956	99.644	9928.926	99.644
28	0	120.035	66.139	79.390	-79.390	6302.726	79.390

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ตาราง 3.12 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
29	336.4	105.953	223.998	237.334	99.066	9814.167	99.066
30	140.3	143.454	103.045	147.822	-7.522	56.577	7.522
31	38.7	151.887	91.433	138.875	-100.175	10035.076	100.175
32	119.1	142.754	135.742	193.777	-74.677	5576.594	74.677
33	347.9	150.331	244.904	368.166	-20.266	410.703	20.266
34	243	140.840	236.174	332.627	-89.627	8032.982	89.627
35	7.6	143.183	54.777	78.431	-70.831	5017.019	70.831
36	0	122.713	7.250	8.896	-8.896	79.143	8.896
37	0	115.310	3.868	4.460	-4.460	19.889	4.460
38	0	113.320	8.835	10.011	-10.011	100.227	10.011
39	64.3	111.304	23.837	26.531	37.769	1426.463	37.769
40	123.3	99.948	66.139	66.104	57.196	3271.339	57.196
41	267.8	120.167	223.998	269.171	-1.371	1.879	1.371
42	50.6	107.897	103.045	111.182	-60.582	3670.177	60.582
43	90.9	93.071	91.433	85.098	5.802	33.658	5.802
44	131	103.371	135.742	140.317	-9.317	86.816	9.317
45	267.7	106.834	244.904	261.640	6.060	36.727	6.060
46	299.1	93.942	236.174	221.865	77.235	5965.179	77.235
47	170.2	105.651	54.777	57.872	112.328	12617.527	112.328
48	3.9	134.570	7.250	9.756	-5.856	34.291	5.856
49	76.6	134.359	3.868	5.196	71.404	5098.477	71.404
50	0	146.736	8.835	12.964	-12.964	168.052	12.964
51	0	145.187	23.837	34.608	-34.608	1197.711	34.608
52	3.3	131.987	66.139	87.295	-83.995	7055.132	83.995
53	199.3	110.658	223.998	247.871	-48.571	2359.105	48.571
54	107.1	98.691	103.045	101.695	5.405	29.209	5.405
55	64.4	108.251	91.433	98.977	-34.577	1195.602	34.577
56	87.8	103.366	135.742	140.311	-52.511	2757.439	52.511
57	192.4	95.897	244.904	234.857	-42.457	1802.561	42.457
58	276.8	82.552	236.174	194.966	81.834	6696.767	81.834
59	85.1	79.486	54.777	43.540	41.560	1727.220	41.560
60	33.7	67.036	7.250	4.860	28.840	831.755	28.840
61	0	75.263	3.868	2.911	-2.911	8.473	2.911
62	0.3	65.402	8.835	5.778	-5.478	30.009	5.478
63	4.3	69.521	23.837	16.572	-12.272	150.593	12.272
64	20.9	73.804	66.139	48.813	-27.913	779.137	27.913

ตาราง 3.12 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
65	166.1	79.376	223.998	177.800	-11.700	136.893	11.700
66	85.4	75.422	103.045	77.718	7.682	59.012	7.682
67	132.4	74.200	91.433	67.844	64.556	4167.523	64.556
68	169.5	88.512	135.742	120.148	49.352	2435.621	49.352
69	234.1	104.290	244.904	255.410	-21.310	454.121	21.310
70	280.1	111.835	236.174	264.124	15.976	255.219	15.976
71	43.7	112.188	54.777	61.453	-17.753	315.166	17.753
72	30.7	104.055	7.250	7.544	23.156	536.219	23.156
73	35.9	103.173	3.868	3.990	31.910	1018.232	31.910
74	0	108.440	8.835	9.580	-9.580	91.781	9.580
75	46.5	107.131	23.837	25.537	20.963	439.463	20.963
76	58.2	113.238	66.139	74.894	-16.694	278.691	16.694
77	103.8	118.292	223.998	264.972	-161.172	25976.260	161.172
78	19.6	105.476	103.045	108.688	-89.088	7936.585	89.088
79	108.8	92.385	91.433	84.471	24.329	591.891	24.329
80	60.7	87.720	135.742	119.072	-58.372	3407.310	58.372
81	213.5	69.126	244.904	169.293	44.207	1954.303	44.207
82	140.5	67.080	236.174	158.426	-17.926	321.344	17.926
83	15.6	44.571	54.777	24.415	-8.815	77.697	8.815
84	0.8	42.225	7.250	3.061	-2.261	5.113	2.261
85	7.8	39.773	3.868	1.538	6.262	39.210	6.262
86	23.9	38.173	8.835	3.372	20.528	421.381	20.528
87	0	45.829	23.837	10.924	-10.924	119.340	10.924
88	8.6	41.414	66.139	27.390	-18.790	353.078	18.790
89	273.7	37.147	223.998	83.209	190.491	36286.826	190.491
90	53.8	70.884	103.045	73.043	-19.243	370.280	19.243
91	272.2	79.128	91.433	72.349	199.851	39940.240	199.851
92	40.4	109.328	135.742	148.404	-108.004	11664.825	108.004
93	248	105.401	244.904	258.132	-10.132	102.664	10.132
94	108.9	110.986	236.174	262.121	-153.221	23476.624	153.221
95	0	103.667	54.777	56.785	-56.785	3224.587	56.785
96	0	99.154	7.250	7.188	-7.188	51.672	7.188
97	0	97.093	3.868	3.755	-3.755	14.101	3.755
98	0	93.592	8.835	8.268	-8.268	68.368	8.268
99	0	87.557	23.837	20.871	-20.871	435.593	20.871
100	39.4	85.486	66.139	56.539	-17.139	293.752	17.139

ตาราง 3.12 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
101	156.5	88.354	223.998	197.912	-41.412	1714.955	41.412
102	111.6	66.670	103.045	68.700	42.900	1840.388	42.900
103	44.8	76.611	91.433	70.048	-25.248	637.446	25.248
104	89.8	37.904	135.742	51.451	38.349	1470.626	38.349
105	362.1	48.952	244.904	119.886	242.214	58667.816	242.214
106	33.6	71.111	236.174	167.945	-134.345	18048.592	134.345
107	0	59.192	54.777	32.423	-32.423	1051.277	32.423
108	0	60.836	7.250	4.410	-4.410	19.451	4.410
109	0	62.473	3.868	2.416	-2.416	5.838	2.416
110	0	64.046	8.835	5.658	-5.658	32.015	5.658
111	37.2	65.423	23.837	15.595	21.605	466.781	21.605
112	19.1	73.259	66.139	48.453	-29.353	861.570	29.353
113	277.7	71.059	223.998	159.171	118.529	14049.092	118.529
114	52.2	92.630	103.045	95.451	-43.251	1870.621	43.251
115	66.1	82.327	91.433	75.274	-9.174	84.165	9.174
116	156	84.655	135.742	114.912	41.088	1688.204	41.088
117	297.9	95.009	244.904	232.680	65.220	4253.593	65.220
118	185.7	83.117	236.174	196.301	-10.601	112.371	10.601
119	71.1	108.686	54.777	59.535	11.565	133.753	11.565
120	0	118.944	7.250	8.623	-8.623	74.357	8.623
121	0	116.276	3.868	4.497	-4.497	20.223	4.497
122	0.05	113.607	8.835	10.037	-9.987	99.733	9.987
123	0.3	110.946	23.837	26.446	-26.146	683.619	26.146
124	123.1	102.176	66.139	67.578	55.522	3082.700	55.522
125	234.7	118.004	223.998	264.326	-29.626	877.694	29.626
126	77.4	108.452	103.045	111.754	-34.354	1180.198	34.354
127	72.7	110.606	91.433	101.130	-28.430	808.291	28.430
128	78.8	109.498	135.742	148.635	-69.835	4876.919	69.835
129	90.6	94.331	244.904	231.021	-140.421	19718.074	140.421
130	112	56.684	236.174	133.873	-21.873	478.446	21.873
131	217.2	45.181	54.777	24.749	192.451	37037.418	192.451
132	0	73.027	7.250	5.294	-5.294	28.028	5.294
133	0.05	74.308	3.868	2.874	-2.824	7.974	2.824
134	0	75.598	8.835	6.679	-6.679	44.606	6.679
135	2.6	76.871	23.837	18.324	-15.724	247.233	15.724
136	28.6	78.250	66.139	51.753	-23.153	536.073	23.153

ตาราง 3.12 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
137	197.4	63.657	223.998	142.590	54.810	3004.091	54.810
138	91.4	59.418	103.045	61.227	30.173	910.413	30.173
139	38.9	64.598	91.433	59.064	-20.164	406.582	20.164
140	62.3	61.418	135.742	83.370	-21.070	443.960	21.070
141	113.2	60.886	244.904	149.113	-35.913	1289.714	35.913
142	182.4	65.576	236.174	154.874	27.526	757.680	27.526
143	18.6	77.775	54.777	42.603	-24.003	576.122	24.003
144	0	43.893	7.250	3.182	-3.182	10.126	3.182
145	0.4	46.120	3.868	1.784	-1.384	1.915	1.384
146	0	48.409	8.835	4.277	-4.277	18.290	4.277
147	0.05	50.634	23.837	12.069	-12.019	144.467	12.019
148	0.6	52.434	66.139	34.679	-34.079	1161.401	34.079
149	175.2	49.062	223.998	109.898	65.302	4264.411	65.302
150	98.9	46.620	103.045	48.040	50.860	2586.776	50.860
151	59.7	49.632	91.433	45.380	14.320	205.062	14.320
152	188.9	54.613	135.742	74.133	114.767	13171.383	114.767
153	169	77.657	244.904	190.185	-21.185	448.815	21.185
154	289	87.555	236.174	206.783	82.217	6759.617	82.217
155	214	106.393	54.777	58.279	155.721	24249.079	155.721
156	14.1	138.143	7.250	10.015	4.085	16.688	4.085
157	0.05	136.813	3.868	5.291	-5.241	27.471	5.241
158	21.7	132.862	8.835	11.738	9.962	99.247	9.962
159	0	132.741	23.837	31.641	-31.641	1001.174	31.641
160	43.2	128.646	66.139	85.085	-41.885	1754.335	41.885
161	116.4	131.726	223.998	295.063	-178.663	31920.328	178.663
162	106.8	116.669	103.045	120.222	-13.422	180.144	13.422
163	60.9	113.737	91.433	103.994	-43.094	1857.069	43.094
164	71.7	109.748	135.742	148.973	-77.273	5971.185	77.273
165	214.6	86.232	244.904	211.185	3.415	11.665	3.415
166	248.7	92.399	236.174	218.223	30.477	928.852	30.477
167	2.6	84.154	54.777	46.097	-43.497	1892.005	43.497
168	0	48.139	7.250	3.490	-3.490	12.180	3.490
169	0	48.228	3.868	1.865	-1.865	3.479	1.865
170	0	50.869	8.835	4.494	-4.494	20.197	4.494
171	0.8	49.930	23.837	11.902	-11.102	123.248	11.102
172	40.4	53.075	66.139	35.103	5.297	28.060	5.297

ตาราง 3.12 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
173	148.4	55.937	223.998	125.299	23.101	533.678	23.101
174	59.9	64.382	103.045	66.343	-6.443	41.507	6.443
175	61.5	58.931	91.433	53.883	7.617	58.019	7.617
176	37.7	62.122	135.742	84.325	-46.625	2173.924	46.625
177	307.3	58.339	244.904	142.873	164.427	27036.129	164.427
178	194.2	77.205	236.174	182.338	11.862	140.707	11.862
179	118.2	69.424	54.777	38.029	80.171	6427.466	80.171
180	0	89.887	7.250	6.517	-6.517	42.465	6.517
181	0	89.216	3.868	3.450	-3.450	11.906	3.450
182	0	88.545	8.835	7.823	-7.823	61.193	7.823
183	0.05	87.696	23.837	20.904	-20.854	434.885	20.854
184	35	86.723	66.139	57.357	-22.357	499.847	22.357
185	196.3	84.925	223.998	190.231	6.069	36.831	6.069
186	57.7	92.689	103.045	95.511	-37.811	1429.663	37.811
187	21.8	90.976	91.433	83.182	-61.382	3767.800	61.382
188	120.3	82.776	135.742	112.361	7.939	63.020	7.939
189	228.6	95.855	244.904	234.753	-6.153	37.857	6.153
190	128.8	81.014	236.174	191.333	-62.533	3910.399	62.533
191	0.2	68.680	54.777	37.621	-37.421	1400.314	37.421
192	6.1	48.700	7.250	3.531	2.569	6.602	2.569
193	0	51.233	3.868	1.981	-1.981	3.926	1.981
194	0	52.658	8.835	4.652	-4.652	21.642	4.652
195	26.4	54.082	23.837	12.891	13.509	182.481	13.509
196	72.6	60.075	66.139	39.733	32.867	1080.256	32.867
197	73.3	67.760	223.998	151.781	-78.481	6159.341	78.481
198	169.6	47.648	103.045	49.099	120.501	14520.489	120.501
199	15.6	69.309	91.433	63.371	-47.771	2282.110	47.771
200	256.5	69.222	135.742	93.963	162.537	26418.266	162.537
201	229.4	94.586	244.904	231.644	-2.244	5.037	2.244
202	139.5	94.679	236.174	223.607	-84.107	7074.036	84.107
203	89.5	95.948	54.777	52.557	36.943	1364.767	36.943
204	0	109.806	7.250	7.961	-7.961	63.371	7.961
205	0	106.419	3.868	4.116	-4.116	16.940	4.116
206	0.1	104.141	8.835	9.200	-9.100	82.818	9.100
207	0	101.881	23.837	24.285	-24.285	589.771	24.285
208	69.8	95.235	66.139	62.987	6.813	46.412	6.813

ตาราง 3.12 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
209	168.5	93.212	223.998	208.793	-40.293	1623.494	40.293
210	244.3	107.216	103.045	110.481	133.819	17907.654	133.819
211	180.3	117.798	91.433	107.707	72.593	5269.769	72.593
212	68.4	143.341	135.742	194.574	-126.174	15919.941	126.174
213	183.2	107.401	244.904	263.028	-79.828	6372.552	79.828
214	414.1	97.646	236.174	230.613	183.487	33667.386	183.487
215	46.4	144.052	54.777	78.907	-32.507	1056.716	32.507
216	0	133.781	7.250	9.699	-9.699	94.064	9.699
217	0.7	131.297	3.868	5.078	-4.378	19.167	4.378
218	10.4	128.934	8.835	11.391	-0.991	0.982	0.991
219	36.7	128.233	23.837	30.567	6.133	37.616	6.133
220	0.05	131.815	66.139	87.180	-87.130	7591.718	87.130
221	133	116.591	223.998	261.160	-128.160	16425.082	128.160
222	80.7	108.667	103.045	111.975	-31.275	978.141	31.275
223	59.4	79.407	91.433	72.605	-13.205	174.368	13.205
224	29.6	60.256	135.742	81.792	-52.192	2724.038	52.192
225	76.4	54.806	244.904	134.222	-57.822	3343.418	57.822
226	360.9	37.490	236.174	88.542	272.358	74178.931	272.358
227	5.7	32.610	54.777	17.863	-12.163	147.931	12.163
228	0	29.983	7.250	2.174	-2.174	4.725	2.174
229	0.05	34.756	3.868	1.344	-1.294	1.675	1.294
230	0	39.421	8.835	3.483	-3.483	12.129	3.483
231	2	42.484	23.837	10.127	-8.127	66.046	8.127
232	89.8	41.715	66.139	27.590	62.210	3870.123	62.210
233	221.8	62.264	223.998	139.470	82.330	6778.299	82.330
234	28.5	81.620	103.045	84.105	-55.605	3091.921	55.605
235	19	74.425	91.433	68.050	-49.050	2405.861	49.050
236	74	68.715	135.742	93.276	-19.276	371.555	19.276
237	175.8	77.741	244.904	190.391	-14.591	212.896	14.591
238	297.5	95.074	236.174	224.541	72.959	5323.067	72.959
239	19.8	82.891	54.777	45.405	-25.605	655.629	25.605
240	0	84.349	7.250	6.115	-6.115	37.394	6.115
241	0.5	83.244	3.868	3.219	-2.719	7.396	2.719
242	0	82.211	8.835	7.263	-7.263	52.751	7.263
243	2.4	81.011	23.837	19.311	-16.911	285.967	16.911
244	54.3	79.596	66.139	52.644	1.656	2.743	1.656

ตาราง 3.12 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
245	40.7	72.682	223.998	162.805	-122.105	14909.705	122.105
246	149.9	41.509	103.045	42.773	107.127	11476.123	107.127
247	57.6	63.913	91.433	58.437	-0.837	0.701	0.837
248	160.3	70.613	135.742	95.851	64.449	4153.674	64.449
249	94.6	85.642	244.904	209.740	-115.140	13257.185	115.140
250	316.4	71.698	236.174	169.333	147.067	21628.807	147.067
251	15.8	75.280	54.777	41.236	-25.436	646.978	25.436
252	5.7	74.846	7.250	5.426	0.274	0.075	0.274
253	7.5	76.129	3.868	2.944	4.556	20.754	4.556
254	90.9	77.594	8.835	6.855	84.045	7063.544	84.045
255	0	93.568	23.837	22.304	-22.304	497.457	22.304
256	22.7	92.602	66.139	61.246	-38.546	1485.770	38.546
257	6.6	86.294	223.998	193.297	-186.697	34855.827	186.697
258	75.7	78.326	103.045	80.710	-5.010	25.105	5.010
259	202.1	64.671	91.433	59.131	142.969	20440.075	142.969
260	111.1	89.912	135.742	122.048	-10.948	119.854	10.948
261	234.4	81.046	244.904	198.484	35.916	1289.936	35.916
262	230.8	104.730	236.174	247.344	-16.544	273.714	16.544
263	1.4	88.290	54.777	48.362	-46.962	2205.457	46.962
264	63.7	84.880	7.250	6.154	57.546	3311.597	57.546
265	0	94.205	3.868	3.643	-3.643	13.275	3.643
266	0	91.740	8.835	8.105	-8.105	65.689	8.105
267	22.9	75.604	23.837	18.022	4.878	23.799	4.878
268	119.4	79.950	66.139	52.878	66.522	4425.153	66.522
269	133.5	96.662	223.998	216.521	-83.021	6892.549	83.021
270	5.7	117.544	103.045	121.123	-115.423	13322.398	115.423
271	49.6	102.591	91.433	93.802	-44.202	1953.829	44.202
272	71.1	75.075	135.742	101.908	-30.808	949.160	30.808
273	213.3	67.939	244.904	166.384	46.916	2201.071	46.916
274	152.5	65.559	236.174	154.833	-2.333	5.444	2.333
275	0	52.720	54.777	28.878	-28.878	833.944	28.878
276	0	53.755	7.250	3.897	-3.897	15.187	3.897
277	0	44.462	3.868	1.720	-1.720	2.957	1.720
278	0	46.690	8.835	4.125	-4.125	17.014	4.125
279	36.8	48.171	23.837	11.482	25.318	640.978	25.318
280	74.2	52.254	66.139	34.560	39.640	1571.343	39.640

ตาราง 3.12 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
281	363.1	46.755	223.998	104.731	258.369	66754.747	258.369
282	105.2	90.378	103.045	93.129	12.071	145.699	12.071
283	71.1	108.954	91.433	99.621	-28.521	813.429	28.521
284	134.1	111.921	135.742	151.924	-17.824	317.699	17.824
285	34.6	121.588	244.904	297.775	-263.175	69260.887	263.175
286	118.8	88.603	236.174	209.258	-90.458	8182.626	90.458
287	6.4	81.616	54.777	44.707	-38.307	1467.401	38.307
288	0	81.855	7.250	5.934	-5.934	35.215	5.934
289	0.05	80.409	3.868	3.110	-3.060	9.363	3.060
290	0	78.970	8.835	6.977	-6.977	48.674	6.977
291	15.8	77.523	23.837	18.479	-2.679	7.177	2.679
292	61.3	72.544	66.139	47.980	13.320	177.431	13.320
293	177.2	68.773	223.998	154.049	23.151	535.968	23.151
294	55.5	36.957	103.045	38.082	17.418	303.391	17.418
295	76.1	31.129	91.433	28.462	47.638	2269.368	47.638
296	117.2	35.382	135.742	48.028	69.172	4784.764	69.172
297	234.5	36.309	244.904	88.922	145.578	21193.015	145.578
298	105.3	73.547	236.174	173.698	-68.398	4678.325	68.398
299	28.2	71.819	54.777	39.340	-11.140	124.104	11.140
300	0	76.383	7.250	5.537	-5.537	30.664	5.537
301	0	76.983	3.868	2.977	-2.977	8.865	2.977
302	30.6	77.575	8.835	6.853	23.747	563.899	23.747
303	44	83.489	23.837	19.901	24.099	580.754	24.099
304	155.6	88.563	66.139	58.574	97.026	9414.008	97.026
305	228.5	104.774	223.998	234.693	-6.193	38.349	6.193
306	250.2	111.221	103.045	114.608	135.592	18385.190	135.592
307	138.6	141.735	91.433	129.594	9.006	81.117	9.006
308	167.1	147.741	135.742	200.547	-33.447	1118.675	33.447
309	375.9	150.908	244.904	369.579	6.321	39.959	6.321
310	81.2	171.191	236.174	404.307	-323.107	104398.271	323.107
311	77.2	161.470	54.777	88.448	-11.248	126.517	11.248
312	0.05	164.816	7.250	11.949	-11.899	141.577	11.899
313	0	159.263	3.868	6.160	-6.160	37.940	6.160
314	0	153.700	8.835	13.579	-13.579	184.380	13.579
315	44.3	143.075	23.837	34.105	10.195	103.947	10.195
316	74.9	138.298	66.139	91.468	-16.568	274.510	16.568

ตาราง 3.12 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
317	65.4	120.229	223.998	269.311	-203.911	41579.690	203.911
318	17.5	88.939	103.045	91.647	-74.147	5497.728	74.147
319	90.9	48.501	91.433	44.346	46.554	2167.250	46.554
320	221.5	42.604	135.742	57.832	163.668	26787.164	163.668
321	204.2	55.235	244.904	135.271	68.929	4751.139	68.929
322	63.6	29.325	236.174	69.258	-5.658	32.014	5.658
323	17.3	31.380	54.777	17.189	0.111	0.012	0.111
324	0	26.639	7.250	1.931	-1.931	3.730	1.931
325	0	32.780	3.868	1.268	-1.268	1.607	1.268
326	0	38.930	8.835	3.439	-3.439	11.828	3.439
327	0	44.828	23.837	10.686	-10.686	114.184	10.686
328	0.05	43.039	66.139	28.465	-28.415	807.427	28.415
329	90.1	35.646	223.998	79.847	10.253	105.117	10.253
330	56.1	44.813	103.045	46.177	9.923	98.458	9.923
331	84.1	54.280	91.433	49.630	34.470	1188.170	34.470
332	110.8	55.157	135.742	74.871	35.929	1290.873	35.929
333	225.2	38.498	244.904	94.283	130.917	17139.158	130.917
334	153.2	44.203	236.174	104.396	48.804	2381.819	48.804
335	42.1	61.501	54.777	33.688	8.412	70.756	8.412
336	1.9	66.322	7.250	4.808	-2.908	8.457	2.908
337	0.9	66.963	3.868	2.590	-1.690	2.856	1.690
338	9.1	67.415	8.835	5.956	3.144	9.886	3.144
339	2.8	69.284	23.837	16.515	-13.715	188.103	13.715
340	179.1	69.620	66.139	46.046	133.054	17703.409	133.054
341	315.2	99.918	223.998	223.814	91.386	8351.330	91.386
342	60.6	136.944	103.045	141.114	-80.514	6482.479	80.514
343	36.1	134.141	91.433	122.650	-86.550	7490.839	86.550
344	104.8	122.130	135.742	165.782	-60.982	3718.831	60.982
345	178.6	116.897	244.904	286.285	-107.685	11596.146	107.685
346	264.4	104.837	236.174	247.596	16.804	282.359	16.804
347	42.7	121.290	54.777	66.439	-23.739	563.526	23.739
348	6.4	117.832	7.250	8.542	-2.142	4.590	2.142
349	0	115.063	3.868	4.450	-4.450	19.803	4.450
350	30.8	111.326	8.835	9.835	20.965	439.523	20.965
351	7.3	111.595	23.837	26.601	-19.301	372.522	19.301
352	178.7	108.723	66.139	71.908	106.792	11404.484	106.792

ตาราง 3.12 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
353	286.4	106.433	223.998	238.408	47.992	2303.261	47.992
354	101.2	101.063	103.045	104.140	-2.940	8.644	2.940
355	19.4	108.015	91.433	98.761	-79.361	6298.244	79.361
356	150.2	104.291	135.742	141.567	8.633	74.527	8.633
357	247.6	111.437	244.904	272.914	-25.314	640.796	25.314
358	324.8	121.925	236.174	287.955	36.845	1357.552	36.845
359	7.4	131.266	54.777	71.904	-64.504	4160.708	64.504
360	0	123.502	7.250	8.953	-8.953	80.165	8.953
361	0	121.082	3.868	4.683	-4.683	21.930	4.683
362	0	119.818	8.835	10.585	-10.585	112.051	10.585
363	193.8	113.385	23.837	27.027	166.773	27813.089	166.773
364	0	144.967	66.139	95.880	-95.880	9192.912	95.880
365	398.7	111.613	223.998	250.011	148.689	22108.365	148.689
366	30.2	130.010	103.045	133.969	-103.769	10767.914	103.769
367	48.8	115.995	91.433	106.059	-57.259	3278.541	57.259
368	53.8	119.857	135.742	162.696	-108.896	11858.389	108.896
369	150.1	102.010	244.904	249.826	-99.726	9945.218	99.726
370	290.3	85.329	236.174	201.524	88.776	7881.139	88.776
371	22.9	80.881	54.777	44.304	-21.404	458.142	21.404
372	12.3	85.108	7.250	6.170	6.130	37.577	6.130
รวม						1662434.776	15576.851

3.2.3. วิธีการทำให้เรียบแบบเอ็กซ์โพเนนเชียลสองชั้น (Double Exponential Smoothing)

1) ค่าแนวโน้ม (T) จากที่กล่าวไว้ในบทที่ 2 (2.2.2.2) วิธีการทำให้เรียบแบบเอ็กซ์โพเนนเชียลสองชั้นนี้จะต้องกำหนดค่า θ เช่นเดียวกับวิธีการทำให้เรียบแบบเอ็กซ์โพเนนเชียลเพื่อใช้ในการวิเคราะห์หาค่าแนวโน้ม ซึ่งในการวิเคราะห์ได้ทำการกำหนดค่า θ ตั้งแต่ 0.0001 – 0.9999 ปรากฏว่าค่า θ ที่ทำให้ค่าคลาดเคลื่อนกำลังสองมีค่าน้อยที่สุดคือ $\theta = 0.9787$ การคำนวณค่าแนวโน้ม แสดงดังตาราง 3.13

ตาราง 3.13 แสดงการหาค่าแนวโน้มโดยวิธีการทำให้เรียบแบบเอ็กซ์โพเนนเชียลสองชั้น

เดือน	ข้อมูล Y	$S_t^{(1)}$	$S_t^{(2)}$	a_0	a_1	ค่าแนวโน้ม T	Y/T = SCI
1	0	0.000	0.000	0.000	0.000	*	*
2	0	0.000	0.000	0.000	0.000	0.000	*
3	13.7	0.292	0.006	0.577	0.006	0.000	*
4	14.1	0.586	0.019	1.153	0.012	0.584	2415.956
5	222.7	5.317	0.131	10.502	0.113	1.166	19105.493
6	55.6	6.388	0.265	12.511	0.133	10.615	523.770
7	101.4	8.412	0.438	16.385	0.174	12.645	801.927
8	194.9	12.384	0.693	24.075	0.254	16.559	1177.018
9	182.1	15.999	1.019	30.979	0.326	24.330	748.469
10	210.6	20.144	1.426	38.862	0.407	31.305	672.733
11	20.4	20.149	1.825	38.474	0.399	39.269	51.949
12	18.2	20.108	2.214	38.001	0.389	38.873	46.820
13	0.7	19.694	2.587	36.802	0.372	38.391	1.823
14	3.1	19.341	2.943	35.738	0.357	37.175	8.339
15	7.3	19.085	3.287	34.882	0.344	36.095	20.224
16	74.7	20.269	3.649	36.889	0.362	35.226	212.062
17	112.3	22.229	4.045	40.414	0.396	37.251	301.469
18	73.9	23.330	4.456	42.204	0.411	40.810	181.084
19	68.8	24.298	4.878	43.719	0.423	42.615	161.445
20	47.4	24.791	5.302	44.279	0.424	44.141	107.382
21	380.5	32.367	5.879	58.855	0.576	44.703	851.176
22	208.9	36.127	6.523	65.731	0.644	59.432	351.494
23	107.4	37.645	7.186	68.105	0.663	66.376	161.806
24	29.8	37.478	7.831	67.125	0.645	68.768	43.334
25	0	36.680	8.446	64.914	0.614	67.771	0.000
26	0	35.899	9.030	62.767	0.585	65.529	0.000
27	123.6	37.767	9.643	65.891	0.612	63.352	195.101
28	0	36.962	10.224	63.700	0.582	66.503	0.000
29	336.4	43.340	10.930	75.751	0.705	64.282	523.318
30	140.3	45.406	11.664	79.147	0.734	76.456	183.504
31	38.7	45.263	12.380	78.146	0.716	79.881	48.447
32	119.1	46.835	13.114	80.557	0.734	78.861	151.025
33	347.9	53.248	13.969	92.528	0.855	81.291	427.968
34	243	57.290	14.891	99.688	0.923	93.383	260.220

ตาราง 3.13 (ต่อ)

เดือน	ข้อมูล Y	$S_t^{(1)}$	$S_t^{(2)}$	a_0	a_1	ค่าแนวโน้ม T	Y/T = SCI
35	7.6	56.231	15.772	96.691	0.881	100.611	7.554
36	0	55.034	16.608	93.459	0.836	97.572	0.000
37	0	53.862	17.402	90.321	0.793	94.296	0.000
38	0	52.714	18.154	87.275	0.752	91.115	0.000
39	64.3	52.961	18.895	87.027	0.741	88.027	73.046
40	123.3	54.459	19.653	89.266	0.758	87.768	140.483
41	267.8	59.003	20.491	97.516	0.838	90.023	297.478
42	50.6	58.824	21.307	96.342	0.817	98.354	51.447
43	90.9	59.508	22.121	96.894	0.814	97.158	93.559
44	131	61.030	22.950	99.111	0.829	97.708	134.073
45	267.7	65.433	23.855	107.010	0.905	99.940	267.861
46	299.1	70.410	24.846	115.973	0.992	107.915	277.162
47	170.2	72.535	25.862	119.208	1.016	116.965	145.514
48	3.9	71.073	26.825	115.321	0.963	120.224	3.244
49	76.6	71.191	27.770	114.612	0.945	116.284	65.873
50	0	69.675	28.663	110.687	0.893	115.557	0.000
51	0	68.191	29.505	106.876	0.842	111.579	0.000
52	3.3	66.808	30.299	103.318	0.795	107.718	3.064
53	199.3	69.630	31.137	108.124	0.838	104.112	191.428
54	107.1	70.429	31.974	108.883	0.837	108.962	98.291
55	64.4	70.300	32.790	107.810	0.816	109.720	58.695
56	87.8	70.673	33.597	107.749	0.807	108.626	80.827
57	192.4	73.266	34.442	112.089	0.845	108.556	177.236
58	276.8	77.601	35.361	119.841	0.919	112.934	245.098
59	85.1	77.761	36.264	119.257	0.903	120.760	70.470
60	33.7	76.822	37.128	116.516	0.864	120.160	28.046
61	0	75.186	37.939	112.433	0.811	117.380	0.000
62	0.3	73.591	38.698	108.483	0.759	113.243	0.265
63	4.3	72.115	39.410	104.820	0.712	109.243	3.936
64	20.9	71.024	40.083	101.965	0.673	105.531	19.805
65	166.1	73.049	40.786	105.313	0.702	102.638	161.831
66	85.4	73.312	41.478	105.146	0.693	106.015	80.555

ตาราง 3.13 (ต่อ)

เดือน	ข้อมูล Y	$S_t^{(1)}$	$S_t^{(2)}$	a_0	a_1	ค่าแนวโน้ม T	Y/T = SCI
67	132.4	74.571	42.183	106.958	0.705	105.839	125.096
68	169.5	76.593	42.916	110.269	0.733	107.663	157.436
69	234.1	79.948	43.705	116.190	0.789	111.002	210.897
70	280.1	84.211	44.568	123.854	0.863	116.979	239.444
71	43.7	83.348	45.394	121.302	0.826	124.717	35.039
72	30.7	82.227	46.178	118.275	0.785	122.128	25.137
73	35.9	81.240	46.925	115.555	0.747	119.059	30.153
74	0	79.509	47.619	111.400	0.694	116.301	0.000
75	46.5	78.806	48.283	109.329	0.664	112.094	41.483
76	58.2	78.367	48.924	107.811	0.641	109.994	52.912
77	103.8	78.909	49.563	108.255	0.639	108.451	95.711
78	19.6	77.646	50.161	105.131	0.598	108.894	17.999
79	108.8	78.309	50.761	105.858	0.600	105.729	102.905
80	60.7	77.934	51.339	104.529	0.579	106.458	57.018
81	213.5	80.822	51.967	109.676	0.628	105.108	203.124
82	140.5	82.093	52.609	111.577	0.642	110.304	127.375
83	15.6	80.677	53.207	108.147	0.598	112.219	13.901
84	0.8	78.975	53.756	104.195	0.549	108.744	0.736
85	7.8	77.459	54.261	100.658	0.505	104.744	7.447
86	23.9	76.319	54.731	97.907	0.470	101.163	23.625
87	0	74.693	55.156	94.230	0.425	98.376	0.000
88	8.6	73.285	55.542	91.028	0.386	94.655	9.086
89	273.7	77.554	56.011	99.097	0.469	91.415	299.405
90	53.8	77.048	56.459	97.637	0.448	99.566	54.034
91	272.2	81.205	56.986	105.424	0.527	98.085	277.513
92	40.4	80.336	57.483	103.188	0.497	105.951	38.131
93	248	83.907	58.046	109.768	0.563	103.685	239.185
94	108.9	84.439	58.608	110.270	0.562	110.331	98.703
95	0	82.641	59.120	106.161	0.512	110.832	0.000
96	0	80.880	59.584	102.177	0.463	106.673	0.000
97	0	79.158	60.001	98.315	0.417	102.641	0.000
98	0	77.472	60.373	94.571	0.372	98.732	0.000

ตาราง 3.13 (ต่อ)

เดือน	ข้อมูล Y	$S_t^{(1)}$	$S_t^{(2)}$	a_0	a_1	ค่าแนวโน้ม T	Y/T = SCI
99	0	75.821	60.702	90.941	0.329	94.943	0.000
100	39.4	75.046	61.007	89.084	0.306	91.270	43.169
101	156.5	76.781	61.343	92.218	0.336	89.390	175.076
102	111.6	77.522	61.688	93.357	0.345	92.554	120.578
103	44.8	76.825	62.010	91.640	0.322	93.701	47.811
104	89.8	77.102	62.332	91.872	0.321	91.963	97.648
105	362.1	83.172	62.776	103.569	0.444	92.193	392.763
106	33.6	82.116	63.188	101.045	0.412	104.013	32.304
107	0	80.367	63.554	97.181	0.366	101.457	0.000
108	0	78.655	63.875	93.436	0.322	97.547	0.000
109	0	76.980	64.154	89.806	0.279	93.757	0.000
110	0	75.340	64.393	86.288	0.238	90.085	0.000
111	37.2	74.528	64.609	84.447	0.216	86.526	42.993
112	19.1	73.347	64.795	81.900	0.186	84.663	22.560
113	277.7	77.700	65.070	90.331	0.275	82.086	338.303
114	52.2	77.157	65.327	88.987	0.257	90.605	57.612
115	66.1	76.921	65.574	88.269	0.247	89.244	74.066
116	156	78.606	65.852	91.360	0.278	88.516	176.240
117	297.9	83.277	66.223	100.331	0.371	91.638	325.085
118	185.7	85.458	66.632	104.284	0.410	100.702	184.406
119	71.1	85.153	67.027	103.278	0.394	104.694	67.912
120	0	83.339	67.374	99.303	0.347	103.673	0.000
121	0	81.564	67.677	95.451	0.302	99.651	0.000
122	0.05	79.827	67.935	91.719	0.259	95.753	0.052
123	0.3	78.133	68.153	88.114	0.217	91.978	0.326
124	123.1	79.091	68.386	89.797	0.233	88.332	139.361
125	234.7	82.406	68.684	96.127	0.299	90.030	260.691
126	77.4	82.299	68.974	95.624	0.290	96.426	80.269
127	72.7	82.095	69.254	94.936	0.279	95.914	75.797
128	78.8	82.024	69.526	94.523	0.272	95.215	82.760
129	90.6	82.207	69.796	94.618	0.270	94.795	95.574
130	112	82.842	70.074	95.610	0.278	94.889	118.033

ตาราง 3.13 (ต่อ)

เดือน	ข้อมูล Y	$S_t^{(1)}$	$S_t^{(2)}$	a_0	a_1	ค่าแนวโน้ม T	Y/T = SCI
131	217.2	85.704	70.407	101.001	0.333	95.888	226.515
132	0	83.878	70.694	97.063	0.287	101.333	0.000
133	0.05	82.093	70.936	93.249	0.243	97.350	0.051
134	0	80.344	71.137	89.551	0.200	93.492	0.000
135	2.6	78.688	71.298	86.078	0.161	89.752	2.897
136	28.6	77.621	71.432	83.810	0.135	86.239	33.164
137	197.4	80.172	71.618	88.726	0.186	83.945	235.155
138	91.4	80.412	71.806	89.017	0.187	88.913	102.798
139	38.9	79.527	71.970	87.085	0.164	89.205	43.608
140	62.3	79.160	72.123	86.198	0.153	87.249	71.405
141	113.2	79.885	72.289	87.482	0.165	86.351	131.093
142	182.4	82.069	72.497	91.641	0.208	87.648	208.106
143	18.6	80.717	72.672	88.762	0.175	91.849	20.251
144	0	78.998	72.807	85.189	0.135	88.937	0.000
145	0.4	77.324	72.903	81.744	0.096	85.324	0.469
146	0	75.677	72.962	78.391	0.059	81.841	0.000
147	0.05	74.066	72.986	75.146	0.024	78.450	0.064
148	0.6	72.501	72.975	72.027	-0.010	75.170	0.798
149	175.2	74.689	73.012	76.365	0.036	72.017	243.278
150	98.9	75.204	73.058	77.350	0.047	76.402	129.447
151	59.7	74.874	73.097	76.651	0.039	77.397	77.135
152	188.9	77.303	73.187	81.419	0.090	76.690	246.318
153	169	79.256	73.316	85.196	0.129	81.508	207.341
154	289	83.723	73.538	93.909	0.222	85.325	338.705
155	214	86.498	73.814	99.183	0.276	94.131	227.343
156	14.1	84.956	74.051	95.861	0.237	99.459	14.177
157	0.05	83.148	74.245	92.051	0.194	96.099	0.052
158	21.7	81.839	74.407	89.271	0.162	92.244	23.524
159	0	80.096	74.528	85.664	0.121	89.433	0.000
160	43.2	79.310	74.630	83.990	0.102	85.785	50.359
161	116.4	80.100	74.746	85.454	0.117	84.092	138.420
162	106.8	80.669	74.872	86.465	0.126	85.570	124.810

ตาราง 3.13 (ต่อ)

เดือน	ข้อมูล Y	$S_t^{(1)}$	$S_t^{(2)}$	a_0	a_1	ค่าแนวโน้ม T	Y/T = SCI
163	60.9	80.248	74.987	85.508	0.114	86.591	70.331
164	71.7	80.065	75.095	85.036	0.108	85.623	83.739
165	214.6	82.931	75.262	90.600	0.167	85.144	252.043
166	248.7	86.462	75.500	97.423	0.239	90.767	273.998
167	2.6	84.676	75.696	93.655	0.195	97.662	2.662
168	0	82.872	75.849	89.895	0.153	93.851	0.000
169	0	81.107	75.961	86.253	0.112	90.048	0.000
170	0	79.379	76.034	82.725	0.073	86.365	0.000
171	0.8	77.706	76.069	79.342	0.036	82.798	0.966
172	40.4	76.911	76.087	77.735	0.018	79.378	50.896
173	148.4	78.434	76.137	80.730	0.050	77.753	190.861
174	59.9	78.039	76.178	79.900	0.041	80.780	74.152
175	61.5	77.687	76.210	79.164	0.032	79.941	76.932
176	37.7	76.835	76.223	77.447	0.013	79.196	47.604
177	307.3	81.744	76.341	87.147	0.118	77.460	396.720
178	194.2	84.139	76.507	91.772	0.166	87.265	222.541
179	118.2	84.865	76.685	93.045	0.178	91.938	128.565
180	0	83.057	76.821	89.294	0.136	93.223	0.000
181	0	81.288	76.916	85.660	0.095	89.429	0.000
182	0	79.556	76.972	82.141	0.056	85.755	0.000
183	0.05	77.863	76.991	78.735	0.019	82.197	0.061
184	35	76.950	76.990	76.910	-0.001	78.754	44.442
185	196.3	79.492	77.043	81.941	0.053	76.909	255.236
186	57.7	79.028	77.086	80.970	0.042	81.994	70.371
187	21.8	77.809	77.101	78.517	0.015	81.013	26.909
188	120.3	78.714	77.135	80.293	0.034	78.533	153.185
189	228.6	81.907	77.237	86.576	0.102	80.327	284.586
190	128.8	82.906	77.358	88.453	0.121	86.678	148.596
191	0.2	81.144	77.438	84.849	0.081	88.574	0.226
192	6.1	79.545	77.483	81.608	0.045	84.930	7.182
193	0	77.851	77.491	78.211	0.008	81.653	0.000
194	0	76.193	77.463	74.922	-0.028	78.219	0.000

ตาราง 3.13 (ต่อ)

เดือน	ข้อมูล Y	$S_t^{(1)}$	$S_t^{(2)}$	a_0	a_1	ค่าแนวโน้ม T	Y/T = SCI
195	26.4	75.132	77.414	72.851	-0.050	74.895	35.249
196	72.6	75.078	77.364	72.793	-0.050	72.801	99.724
197	73.3	75.040	77.315	72.766	-0.049	72.743	100.766
198	169.6	77.055	77.309	76.800	-0.006	72.717	233.233
199	15.6	75.746	77.276	74.216	-0.033	76.795	20.314
200	256.5	79.596	77.325	81.866	0.049	74.182	345.770
201	229.4	82.787	77.441	88.132	0.116	81.916	280.044
202	139.5	83.995	77.581	90.408	0.140	88.248	158.077
203	89.5	84.112	77.720	90.503	0.139	90.548	98.843
204	0	82.320	77.818	86.822	0.098	90.643	0.000
205	0	80.567	77.877	83.257	0.059	86.920	0.000
206	0.1	78.853	77.897	79.808	0.021	83.315	0.120
207	0	77.173	77.882	76.465	-0.015	79.829	0.000
208	69.8	77.016	77.864	76.169	-0.018	76.449	91.303
209	168.5	78.965	77.887	80.043	0.023	76.150	221.273
210	244.3	82.486	77.985	86.988	0.098	80.066	305.123
211	180.3	84.570	78.125	91.015	0.140	87.086	207.037
212	68.4	84.225	78.255	90.196	0.130	91.155	75.037
213	183.2	86.334	78.427	94.240	0.172	90.326	202.822
214	414.1	93.315	78.744	107.886	0.317	94.412	438.609
215	46.4	92.316	79.033	105.598	0.289	108.203	42.882
216	0	90.349	79.274	101.424	0.241	105.887	0.000
217	0.7	88.440	79.470	97.410	0.195	101.665	0.689
218	10.4	86.778	79.625	93.930	0.156	97.605	10.655
219	36.7	85.711	79.755	91.667	0.130	94.086	39.007
220	0.05	83.886	79.843	87.930	0.088	91.797	0.054
221	133	84.933	79.951	89.914	0.108	88.018	151.106
222	80.7	84.842	80.056	89.629	0.104	90.022	89.645
223	59.4	84.300	80.146	88.455	0.090	89.733	66.196
224	29.6	83.135	80.210	86.061	0.064	88.545	33.429
225	76.4	82.992	80.269	85.715	0.059	86.125	88.709
226	360.9	88.911	80.453	97.370	0.184	85.774	420.756

ตาราง 3.13 (ต่อ)

เดือน	ข้อมูล Y	$S_t^{(1)}$	$S_t^{(2)}$	a_0	a_1	ค่าแนวโน้ม T	Y/T = SCI
227	5.7	87.139	80.595	93.682	0.142	97.554	5.843
228	0	85.283	80.695	89.870	0.100	93.825	0.000
229	0.05	83.467	80.754	86.181	0.059	89.970	0.056
230	0	81.690	80.774	82.605	0.020	86.240	0.000
231	2	79.992	80.758	79.227	-0.017	82.625	2.421
232	89.8	80.201	80.746	79.656	-0.012	79.210	113.369
233	221.8	83.217	80.798	85.636	0.053	79.645	278.487
234	28.5	82.052	80.825	83.278	0.027	85.689	33.260
235	19	80.709	80.823	80.595	-0.002	83.305	22.808
236	74	80.566	80.817	80.314	-0.005	80.592	91.820
237	175.8	82.594	80.855	84.334	0.038	80.309	218.905
238	297.5	87.172	80.990	93.354	0.135	84.371	352.608
239	19.8	85.737	81.091	90.383	0.101	93.489	21.179
240	0	83.911	81.151	86.670	0.060	90.484	0.000
241	0.5	82.134	81.172	83.096	0.021	86.730	0.576
242	0	80.384	81.155	79.614	-0.017	83.117	0.000
243	2.4	78.723	81.103	76.344	-0.052	79.597	3.015
244	54.3	78.203	81.041	75.365	-0.062	76.292	71.174
245	40.7	77.404	80.964	73.845	-0.077	75.303	54.048
246	149.9	78.948	80.921	76.976	-0.043	73.767	203.206
247	57.6	78.494	80.869	76.118	-0.052	76.933	74.870
248	160.3	80.236	80.856	79.617	-0.013	76.067	210.736
249	94.6	80.542	80.849	80.235	-0.007	79.603	118.839
250	316.4	85.566	80.950	90.182	0.100	80.229	394.373
251	15.8	84.080	81.016	87.144	0.067	90.283	17.501
252	5.7	82.410	81.046	83.775	0.030	87.210	6.536
253	7.5	80.815	81.041	80.589	-0.005	83.805	8.949
254	90.9	81.030	81.041	81.019	0.000	80.584	112.802
255	0	79.304	81.004	77.604	-0.037	81.018	0.000
256	22.7	78.098	80.942	75.254	-0.062	77.567	29.265
257	6.6	76.575	80.849	72.302	-0.093	75.192	8.777
258	75.7	76.557	80.757	72.356	-0.091	72.208	104.835

ตาราง 3.13 (ต่อ)

เดือน	ข้อมูล Y	$S_t^{(1)}$	$S_t^{(2)}$	a_0	a_1	ค่าแนวโน้ม T	Y/T = SCI
259	202.1	79.231	80.725	77.736	-0.033	72.264	279.668
260	111.1	79.909	80.708	79.111	-0.017	77.704	142.979
261	234.4	83.200	80.761	85.640	0.053	79.094	296.356
262	230.8	86.344	80.880	91.808	0.119	85.693	269.335
263	1.4	84.535	80.957	88.112	0.078	91.927	1.523
264	63.7	84.091	81.024	87.158	0.067	88.190	72.231
265	0	82.300	81.051	83.548	0.027	87.224	0.000
266	0	80.547	81.041	80.053	-0.011	83.575	0.000
267	22.9	79.319	81.004	77.634	-0.037	80.042	28.610
268	119.4	80.173	80.986	79.359	-0.018	77.597	153.872
269	133.5	81.308	80.993	81.624	0.007	79.341	168.260
270	5.7	79.698	80.965	78.431	-0.028	81.631	6.983
271	49.6	79.057	80.925	77.189	-0.041	78.403	63.263
272	71.1	78.887	80.881	76.893	-0.043	77.148	92.160
273	213.3	81.750	80.900	82.601	0.019	76.850	277.553
274	152.5	83.257	80.950	85.565	0.050	82.619	184.581
275	0	81.484	80.962	82.007	0.011	85.615	0.000
276	0	79.748	80.936	78.561	-0.026	82.018	0.000
277	0	78.050	80.874	75.225	-0.061	78.535	0.000
278	0	76.387	80.779	71.996	-0.096	75.164	0.000
279	36.8	75.544	80.667	70.421	-0.111	71.900	51.182
280	74.2	75.515	80.557	70.474	-0.110	70.310	105.533
281	363.1	81.641	80.580	82.702	0.023	70.364	516.032
282	105.2	82.143	80.614	83.672	0.033	82.725	127.169
283	71.1	81.908	80.641	83.174	0.028	83.705	84.941
284	134.1	83.019	80.692	85.347	0.051	83.201	161.175
285	34.6	81.988	80.720	83.256	0.028	85.397	40.517
286	118.8	82.772	80.763	84.781	0.044	83.284	142.644
287	6.4	81.145	80.771	81.519	0.008	84.825	7.545
288	0	79.417	80.743	78.091	-0.029	81.527	0.000
289	0.05	77.726	80.678	74.775	-0.064	78.062	0.064
290	0	76.071	80.580	71.562	-0.098	74.710	0.000

ตาราง 3.13 (ต่อ)

เดือน	ข้อมูล Y	$S_t^{(1)}$	$S_t^{(2)}$	a_0	a_1	ค่าแนวโน้ม T	Y/T = SCI
291	15.8	74.787	80.457	69.117	-0.123	71.463	22.109
292	61.3	74.500	80.330	68.670	-0.127	68.994	88.848
293	177.2	76.687	80.252	73.122	-0.078	68.543	258.524
294	55.5	76.236	80.167	72.305	-0.086	73.045	75.981
295	76.1	76.233	80.083	72.383	-0.084	72.220	105.373
296	117.2	77.106	80.020	74.192	-0.063	72.300	162.103
297	234.5	80.458	80.029	80.888	0.009	74.128	316.343
298	105.3	80.987	80.049	81.925	0.020	80.897	130.166
299	28.2	79.863	80.045	79.681	-0.004	81.946	34.413
300	0	78.162	80.005	76.319	-0.040	79.677	0.000
301	0	76.497	79.931	73.064	-0.075	76.278	0.000
302	30.6	75.519	79.837	71.202	-0.094	72.989	41.924
303	44	74.848	79.730	69.966	-0.106	71.108	61.877
304	155.6	76.568	79.663	73.473	-0.067	69.860	222.732
305	228.5	79.804	79.666	79.943	0.003	73.406	311.283
306	250.2	83.434	79.746	87.121	0.080	79.946	312.963
307	138.6	84.609	79.850	89.368	0.104	87.201	158.942
308	167.1	86.366	79.989	92.743	0.139	89.471	186.764
309	375.9	92.533	80.256	104.810	0.267	92.882	404.708
310	81.2	92.291	80.512	104.071	0.256	105.077	77.277
311	77.2	91.970	80.756	103.184	0.244	104.327	73.998
312	0.05	90.012	80.953	99.071	0.197	103.428	0.048
313	0	88.095	81.105	95.084	0.152	99.268	0.000
314	0	86.218	81.214	91.223	0.109	95.236	0.000
315	44.3	85.326	81.302	89.349	0.088	91.331	48.505
316	74.9	85.104	81.383	88.824	0.081	89.437	83.746
317	65.4	84.684	81.453	87.914	0.070	88.905	73.562
318	17.5	83.253	81.492	85.014	0.038	87.985	19.890
319	90.9	83.416	81.533	85.299	0.041	85.052	106.875
320	221.5	86.357	81.635	91.079	0.103	85.340	259.550
321	204.2	88.867	81.789	95.945	0.154	91.181	223.949
322	63.6	88.329	81.929	94.729	0.139	96.099	66.182
323	17.3	86.816	82.033	91.599	0.104	94.868	18.236

ตาราง 3.13 (ต่อ)

เดือน	ข้อมูล Y	$S_t^{(1)}$	$S_t^{(2)}$	a_0	a_1	ค่าแนวโน้ม T	Y/T = SCI
324	0	84.967	82.095	87.838	0.062	91.703	0.000
325	0	83.157	82.118	84.196	0.023	87.901	0.000
326	0	81.386	82.102	80.669	-0.016	84.219	0.000
327	0	79.652	82.050	77.254	-0.052	80.653	0.000
328	0.05	77.957	81.963	73.950	-0.087	77.202	0.065
329	90.1	78.215	81.883	74.548	-0.080	73.863	121.982
330	56.1	77.744	81.795	73.694	-0.088	74.468	75.335
331	84.1	77.880	81.711	74.048	-0.083	73.605	114.258
332	110.8	78.581	81.645	75.517	-0.067	73.964	149.802
333	225.2	81.704	81.646	81.762	0.001	75.450	298.475
334	153.2	83.227	81.680	84.774	0.034	81.763	187.371
335	42.1	82.351	81.694	83.007	0.014	84.807	49.642
336	1.9	80.637	81.671	79.603	-0.023	83.022	2.289
337	0.9	78.939	81.613	76.264	-0.058	79.580	1.131
338	9.1	77.451	81.525	73.378	-0.089	76.206	11.941
339	2.8	75.861	81.404	70.318	-0.121	73.289	3.820
340	179.1	78.060	81.333	74.787	-0.071	70.197	255.138
341	315.2	83.111	81.371	84.852	0.038	74.716	421.864
342	60.6	82.632	81.398	83.866	0.027	84.889	71.387
343	36.1	81.640	81.403	81.878	0.005	83.893	43.031
344	104.8	82.134	81.418	82.849	0.016	81.883	127.987
345	178.6	84.189	81.477	86.900	0.059	82.865	215.532
346	264.4	88.027	81.617	94.437	0.140	86.959	304.052
347	42.7	87.062	81.733	92.390	0.116	94.577	45.149
348	6.4	85.343	81.810	88.877	0.077	92.506	6.918
349	0	83.526	81.846	85.205	0.037	88.954	0.000
350	30.8	82.403	81.858	82.947	0.012	85.242	36.133
351	7.3	80.803	81.836	79.770	-0.022	82.959	8.800
352	178.7	82.888	81.858	83.918	0.022	79.748	224.082
353	286.4	87.223	81.972	92.474	0.114	83.941	341.193
354	101.2	87.521	82.090	92.951	0.118	92.588	109.302
355	19.4	86.070	82.175	89.964	0.085	93.069	20.845
356	150.2	87.436	82.287	92.584	0.112	90.049	166.798

ตาราง 3.13 (ต่อ)

เดือน	ข้อมูล Y	$S_t^{(1)}$	$S_t^{(2)}$	a_0	a_1	ค่าแนวโน้ม T	Y/T = SCI
357	247.6	90.847	82.470	99.225	0.182	92.696	267.110
358	324.8	95.830	82.754	108.907	0.285	99.407	326.737
359	7.4	93.947	82.993	104.901	0.238	109.191	6.777
360	0	91.946	83.183	100.708	0.191	105.139	0.000
361	0	89.987	83.328	96.646	0.145	100.899	0.000
362	0	88.071	83.429	92.712	0.101	96.791	0.000
363	193.8	90.323	83.576	97.069	0.147	92.813	208.807
364	0	88.399	83.679	93.119	0.103	97.216	0.000
365	398.7	95.008	83.920	106.096	0.241	93.221	427.692
366	30.2	93.628	84.127	103.129	0.207	106.337	28.400
367	48.8	92.673	84.309	101.037	0.182	103.335	47.225
368	53.8	91.845	84.469	99.220	0.161	101.219	53.152
369	150.1	93.086	84.653	101.519	0.184	99.381	151.035
370	290.3	97.286	84.922	109.651	0.269	101.702	285.442
371	22.9	95.702	85.152	106.252	0.230	109.920	20.833
372	12.3	93.925	85.339	102.512	0.187	106.482	11.551

2) ดัชนีฤดูกาล (Seasonal Index) ในการคำนวณค่าดัชนีฤดูกาลจะใช้วิธี

อัตราส่วนต่อค่าแนวโน้ม จากการหาค่าแนวโน้มโดยวิธีการทำให้เรียบแบบเอ็กซ์โพเนนเชียลสองชั้น ที่ $\theta = 0.9787$ ดังตาราง 3.13 เมื่อทำการหาค่าแนวโน้มโดยการหารข้อมูลจริงด้วยค่าแนวโน้ม (Y/T) จะได้ค่า SCI และใช้ SCI นี้ไปหาดัชนีฤดูกาล ดังตาราง 3.14

จะเห็นว่าเมื่อนำค่าดัชนีฤดูกาลของทุกเดือนมารวมกันจะได้เท่ากับ 1,200 เพราะเป็นค่าดัชนีฤดูกาลที่ปรับแล้ว (normalized seasonal index) เนื่องจากเรากำหนดค่าดัชนีฤดูกาลในรูปแบบเปอร์เซ็นต์ นั่นหมายถึง ถ้าปริมาณน้ำฝนในเดือนใดมีค่าดัชนีฤดูกาลเท่ากับ 100 แสดงว่าไม่มีอิทธิพลของฤดูกาลต่อปริมาณน้ำฝน แต่ถ้าค่าดัชนีฤดูกาลในเดือนใดมีค่ามากกว่า 100 แสดงว่าอิทธิพลของฤดูกาลต่อปริมาณน้ำฝนในเดือนนั้นสูงกว่าปริมาณน้ำฝนเฉลี่ย และถ้าค่าดัชนีฤดูกาลใดมีค่าน้อยกว่า 100 แสดงว่าอิทธิพลของฤดูกาลในเดือนนั้นทำให้ปริมาณน้ำฝนต่ำกว่าปริมาณน้ำฝนเฉลี่ย

ตาราง 3.14 แสดงค่าดัชนีฤดูกาล

ปี	เดือน											
	ม.ค.	ก.พ.	มี.ค.	เม.ย.	พ.ค.	มิ.ย.	ก.ค.	ส.ค.	ก.ย.	ต.ค.	พ.ย.	ธ.ค.
2514	*	*	*	2415.956	19105.493	523.770	801.927	1177.018	748.469	672.733	51.949	46.820
2515	1.823	8.339	20.224	212.062	301.469	181.084	161.445	107.382	851.176	351.494	161.806	43.334
2516	0.000	0.000	195.101	0.000	523.318	183.504	48.447	151.025	427.968	260.220	7.554	0.000
2517	0.000	0.000	73.046	140.483	297.478	51.447	93.559	134.073	267.861	277.162	145.514	3.244
2518	65.873	0.000	0.000	3.064	191.428	98.291	58.695	80.827	177.236	245.098	70.470	28.046
2519	0.000	0.265	3.936	19.805	161.831	80.555	125.096	157.436	210.897	239.444	35.039	25.137
2520	30.153	0.000	41.483	52.912	95.711	17.999	102.905	57.018	203.124	127.375	13.901	0.736
2521	7.447	23.625	0.000	9.086	299.405	54.034	277.513	38.131	239.185	98.703	0.000	0.000
2522	0.000	0.000	0.000	43.169	175.076	120.578	47.811	97.648	392.763	32.304	0.000	0.000
2523	0.000	0.000	42.993	22.560	338.303	57.612	74.066	176.240	325.085	184.406	67.912	0.000
2524	0.000	0.052	0.326	139.361	260.691	80.269	75.797	82.760	95.574	118.033	226.515	0.000
2525	0.051	0.000	2.897	33.164	235.155	102.798	43.608	71.405	131.093	208.106	20.251	0.000
2526	0.469	0.000	0.064	0.798	243.278	129.447	77.135	246.318	207.341	338.705	227.343	14.177
2527	0.052	23.524	0.000	50.359	138.420	124.810	70.331	83.739	252.043	273.998	2.662	0.000
2528	0.000	0.000	0.966	50.896	190.861	74.152	76.932	47.604	396.720	222.541	128.565	0.000
2529	0.000	0.000	0.061	44.442	255.236	70.371	26.909	153.185	284.586	148.596	0.226	7.182
2530	0.000	0.000	35.249	99.724	100.766	233.233	20.314	345.770	280.044	158.077	98.843	0.000
2531	0.000	0.120	0.000	91.303	221.273	305.123	207.037	75.037	202.822	438.609	42.882	0.000
2532	0.689	10.655	39.007	0.054	151.106	89.645	66.196	33.429	88.709	420.756	5.843	0.000
2533	0.056	0.000	2.421	113.369	278.487	33.260	22.808	91.820	218.905	352.608	21.179	0.000
2534	0.576	0.000	3.015	71.174	54.048	203.206	74.870	210.736	118.839	394.373	17.501	6.536
2535	8.949	112.802	0.000	29.265	8.777	104.835	279.668	142.979	296.356	269.335	1.523	72.231
2536	0.000	0.000	28.610	153.872	168.260	6.983	63.263	92.160	277.553	184.581	0.000	0.000
2537	0.000	0.000	51.182	105.533	516.032	127.169	84.941	161.175	40.517	142.644	7.545	0.000
2538	0.064	0.000	22.109	88.848	258.524	75.981	105.373	162.103	316.343	130.166	34.413	0.000
2539	0.000	41.924	61.877	222.732	311.283	312.963	158.942	186.764	404.708	77.277	73.998	0.048
2540	0.000	0.000	48.505	83.746	73.562	19.890	106.875	259.550	223.949	66.182	18.236	0.000
2541	0.000	0.000	0.000	0.065	121.982	75.335	114.258	149.802	298.475	187.371	49.642	2.289
2542	1.131	11.941	3.820	255.138	421.864	71.387	43.031	127.987	215.532	304.052	45.149	6.918
2543	0.000	36.133	8.800	224.082	341.193	109.302	20.845	166.798	267.110	326.737	6.777	0.000
2544	0.000	0.000	208.807	0.000	427.692	28.400	47.225	53.152	151.035	285.442	20.833	11.551
รวม	117.333	269.381	894.500	4777.020	26268.004	3747.432	3577.822	5121.072	8612.017	7537.130	1604.072	268.249
ค่าเฉลี่ย	3.911	8.979	29.817	154.097	847.355	120.885	115.414	165.196	277.807	243.133	51.744	8.653
S	2.315	5.316	17.652	91.227	501.643	71.565	68.326	97.798	164.465	143.937	30.633	5.123

3) การพยากรณ์

จากรูปแบบของการพยากรณ์ คือ $\hat{Y} = T \times S$ เมื่อได้ส่วนของค่าแนวโน้ม (T) และดัชนีฤดูกาล (S) แล้วทำการหาค่าพยากรณ์ และ ค่าความคลาดเคลื่อน ดังแสดงในตาราง 3.15 ซึ่งวิธีการทำให้เรียบแบบเอ็กซ์โพเนนเชียลสองชั้นที่ $\theta = 0.9787$ นี้ คำนวณค่า MSE และ MAD ได้

$$MSE = 9,292.456 \quad MAD = 57.900$$

ตาราง 3.15 แสดงการพยากรณ์อนุกรมเวลาโดยวิธีการทำให้เรียบแบบเอ็กซ์โพเนนเชียลสองชั้น

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
1	0	*	*	*	*	*	*
2	0	0.000	5.316	0.000	0.000	0.000	0.000
3	13.7	0.000	17.652	0.000	13.700	187.690	13.700
4	14.1	0.584	91.227	0.532	13.568	184.079	13.568
5	222.7	1.166	501.643	5.847	216.853	47025.086	216.853
6	55.6	10.615	71.565	7.597	48.003	2304.299	48.003
7	101.4	12.645	68.326	8.640	92.760	8604.507	92.760
8	194.9	16.559	97.798	16.194	178.706	31935.794	178.706
9	182.1	24.330	164.465	40.014	142.086	20188.520	142.086
10	210.6	31.305	143.937	45.060	165.540	27403.567	165.540
11	20.4	39.269	30.633	12.029	8.371	70.068	8.371
12	18.2	38.873	5.123	1.991	16.209	262.720	16.209
13	0.7	38.391	2.315	0.889	-0.189	0.036	0.189
14	3.1	37.175	5.316	1.976	1.124	1.263	1.124
15	7.3	36.095	17.652	6.371	0.929	0.862	0.929
16	74.7	35.226	91.227	32.135	42.565	1811.754	42.565
17	112.3	37.251	501.643	186.867	-74.567	5560.201	74.567
18	73.9	40.810	71.565	29.206	44.694	1997.594	44.694
19	68.8	42.615	68.326	29.117	39.683	1574.720	39.683
20	47.4	44.141	97.798	43.169	4.231	17.899	4.231
21	380.5	44.703	164.465	73.520	306.980	94236.460	306.980
22	208.9	59.432	143.937	85.545	123.355	15216.500	123.355
23	107.4	66.376	30.633	20.333	87.067	7580.664	87.067
24	29.8	68.768	5.123	3.523	26.277	690.490	26.277
25	0	67.771	2.315	1.569	-1.569	2.462	1.569
26	0	65.529	5.316	3.483	-3.483	12.134	3.483
27	123.6	63.352	17.652	11.183	112.417	12637.649	112.417
28	0	66.503	91.227	60.669	-60.669	3680.719	60.669

ตาราง 3.15 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
29	336.4	64.282	501.643	322.467	13.933	194.137	13.933
30	140.3	76.456	71.565	54.716	85.584	7324.620	85.584
31	38.7	79.881	68.326	54.580	-15.880	252.168	15.880
32	119.1	78.861	97.798	77.125	41.975	1761.935	41.975
33	347.9	81.291	164.465	133.695	214.205	45883.674	214.205
34	243	93.383	143.937	134.413	108.587	11791.242	108.587
35	7.6	100.611	30.633	30.820	-23.220	539.186	23.220
36	0	97.572	5.123	4.998	-4.998	24.984	4.998
37	0	94.296	2.315	2.183	-2.183	4.767	2.183
38	0	91.115	5.316	4.844	-4.844	23.460	4.844
39	64.3	88.027	17.652	15.538	48.762	2377.702	48.762
40	123.3	87.768	91.227	80.069	43.231	1868.950	43.231
41	267.8	90.023	501.643	451.596	-183.796	33780.927	183.796
42	50.6	98.354	71.565	70.387	-19.787	391.536	19.787
43	90.9	97.158	68.326	66.384	24.516	601.023	24.516
44	131	97.708	97.798	95.556	35.444	1256.272	35.444
45	267.7	99.940	164.465	164.366	103.334	10677.981	103.334
46	299.1	107.915	143.937	155.330	143.770	20669.726	143.770
47	170.2	116.965	30.633	35.830	134.370	18055.319	134.370
48	3.9	120.224	5.123	6.159	-2.259	5.102	2.259
49	76.6	116.284	2.315	2.692	73.908	5462.323	73.908
50	0	115.557	5.316	6.143	-6.143	37.735	6.143
51	0	111.579	17.652	19.696	-19.696	387.920	19.696
52	3.3	107.718	91.227	98.269	-94.969	9019.022	94.969
53	199.3	104.112	501.643	522.271	-322.971	104310.245	322.971
54	107.1	108.962	71.565	77.979	29.121	848.059	29.121
55	64.4	109.720	68.326	74.967	-10.567	111.671	10.567
56	87.8	108.626	97.798	106.234	-18.434	339.815	18.434
57	192.4	108.556	164.465	178.535	13.865	192.225	13.865
58	276.8	112.934	143.937	162.555	114.245	13052.022	114.245
59	85.1	120.760	30.633	36.993	48.107	2314.328	48.107
60	33.7	120.160	5.123	6.156	27.544	758.698	27.544
61	0	117.380	2.315	2.718	-2.718	7.387	2.718
62	0.3	113.243	5.316	6.020	-5.720	32.717	5.720
63	4.3	109.243	17.652	19.283	-14.983	224.498	14.983
64	20.9	105.531	91.227	96.273	-75.373	5681.163	75.373

ตาราง 3.15 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
65	166.1	102.638	501.643	514.876	-348.776	121644.719	348.776
66	85.4	106.015	71.565	75.870	9.530	90.828	9.530
67	132.4	105.839	68.326	72.315	60.085	3610.151	60.085
68	169.5	107.663	97.798	105.292	64.208	4122.665	64.208
69	234.1	111.002	164.465	182.559	51.541	2656.432	51.541
70	280.1	116.979	143.937	168.377	111.723	12482.099	111.723
71	43.7	124.717	30.633	38.205	5.495	30.198	5.495
72	30.7	122.128	5.123	6.256	24.444	597.491	24.444
73	35.9	119.059	2.315	2.757	33.143	1098.477	33.143
74	0	116.301	5.316	6.182	-6.182	38.223	6.182
75	46.5	112.094	17.652	19.787	26.713	713.609	26.713
76	58.2	109.994	91.227	100.344	-42.144	1776.125	42.144
77	103.8	108.451	501.643	544.039	-440.239	193810.265	440.239
78	19.6	108.894	71.565	77.930	-58.330	3402.408	58.330
79	108.8	105.729	68.326	72.240	36.560	1336.610	36.560
80	60.7	106.458	97.798	104.113	-43.413	1884.711	43.413
81	213.5	105.108	164.465	172.866	40.634	1651.153	40.634
82	140.5	110.304	143.937	158.769	-18.269	333.765	18.269
83	15.6	112.219	30.633	34.376	-18.776	352.542	18.776
84	0.8	108.744	5.123	5.571	-4.771	22.760	4.771
85	7.8	104.744	2.315	2.425	5.375	28.888	5.375
86	23.9	101.163	5.316	5.378	18.522	343.076	18.522
87	0	98.376	17.652	17.365	-17.365	301.549	17.365
88	8.6	94.655	91.227	86.352	-77.752	6045.296	77.752
89	273.7	91.415	501.643	458.575	-184.875	34178.728	184.875
90	53.8	99.566	71.565	71.255	-17.455	304.663	17.455
91	272.2	98.085	68.326	67.018	205.182	42099.718	205.182
92	40.4	105.951	97.798	103.617	-63.217	3996.431	63.217
93	248	103.685	164.465	170.526	77.474	6002.264	77.474
94	108.9	110.331	143.937	158.807	-49.907	2490.692	49.907
95	0	110.832	30.633	33.951	-33.951	1152.700	33.951
96	0	106.673	5.123	5.465	-5.465	29.862	5.465
97	0	102.641	2.315	2.377	-2.377	5.648	2.377
98	0	98.732	5.316	5.248	-5.248	27.546	5.248
99	0	94.943	17.652	16.759	-16.759	280.866	16.759
100	39.4	91.270	91.227	83.263	-43.863	1923.994	43.863

ตาราง 3.15 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
101	156.5	89.390	501.643	448.417	-291.917	85215.389	291.917
102	111.6	92.554	71.565	66.236	45.364	2057.854	45.364
103	44.8	93.701	68.326	64.022	-19.222	369.503	19.222
104	89.8	91.963	97.798	89.937	-0.137	0.019	0.137
105	362.1	92.193	164.465	151.625	210.475	44299.713	210.475
106	33.6	104.013	143.937	149.713	-116.113	13482.224	116.113
107	0	101.457	30.633	31.079	-31.079	965.931	31.079
108	0	97.547	5.123	4.997	-4.997	24.971	4.997
109	0	93.757	2.315	2.171	-2.171	4.713	2.171
110	0	90.085	5.316	4.789	-4.789	22.933	4.789
111	37.2	86.526	17.652	15.273	21.927	480.774	21.927
112	19.1	84.663	91.227	77.236	-58.136	3379.798	58.136
113	277.7	82.086	501.643	411.780	-134.080	17977.337	134.080
114	52.2	90.605	71.565	64.842	-12.642	159.818	12.642
115	66.1	89.244	68.326	60.977	5.123	26.244	5.123
116	156	88.516	97.798	86.566	69.434	4821.025	69.434
117	297.9	91.638	164.465	150.711	147.189	21664.475	147.189
118	185.7	100.702	143.937	144.948	40.752	1660.746	40.752
119	71.1	104.694	30.633	32.071	39.029	1523.257	39.029
120	0	103.673	5.123	5.311	-5.311	28.206	5.311
121	0	99.651	2.315	2.307	-2.307	5.324	2.307
122	0.05	95.753	5.316	5.090	-5.040	25.403	5.040
123	0.3	91.978	17.652	16.236	-15.936	253.949	15.936
124	123.1	88.332	91.227	80.582	42.518	1807.738	42.518
125	234.7	90.030	501.643	451.629	-216.929	47058.126	216.929
126	77.4	96.426	71.565	69.007	8.393	70.437	8.393
127	72.7	95.914	68.326	65.534	7.166	51.348	7.166
128	78.8	95.215	97.798	93.118	-14.318	205.009	14.318
129	90.6	94.795	164.465	155.905	-65.305	4264.703	65.305
130	112	94.889	143.937	136.580	-24.580	604.183	24.580
131	217.2	95.888	30.633	29.373	187.827	35278.833	187.827
132	0	101.333	5.123	5.191	-5.191	26.947	5.191
133	0.05	97.350	2.315	2.254	-2.204	4.858	2.204
134	0	93.492	5.316	4.970	-4.970	24.700	4.970
135	2.6	89.752	17.652	15.843	-13.243	175.370	13.243
136	28.6	86.239	91.227	78.674	-50.074	2507.381	50.074

ตาราง 3.15 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
137	197.4	83.945	501.643	421.103	-223.703	50042.887	223.703
138	91.4	88.913	71.565	63.630	27.770	771.151	27.770
139	38.9	89.205	68.326	60.950	-22.050	486.205	22.050
140	62.3	87.249	97.798	85.328	-23.028	530.267	23.028
141	113.2	86.351	164.465	142.016	-28.816	830.380	28.816
142	182.4	87.648	143.937	126.158	56.242	3163.199	56.242
143	18.6	91.849	30.633	28.136	-9.536	90.942	9.536
144	0	88.937	5.123	4.556	-4.556	20.758	4.556
145	0.4	85.324	2.315	1.976	-1.576	2.483	1.576
146	0	81.841	5.316	4.351	-4.351	18.927	4.351
147	0.05	78.450	17.652	13.848	-13.798	190.382	13.798
148	0.6	75.170	91.227	68.575	-67.975	4620.632	67.975
149	175.2	72.017	501.643	361.266	-186.066	34620.449	186.066
150	98.9	76.402	71.565	54.677	44.223	1955.670	44.223
151	59.7	77.397	68.326	52.882	6.818	46.483	6.818
152	188.9	76.690	97.798	75.001	113.899	12973.078	113.899
153	169	81.508	164.465	134.052	34.948	1221.332	34.948
154	289	85.325	143.937	122.815	166.185	27617.550	166.185
155	214	94.131	30.633	28.835	185.165	34285.981	185.165
156	14.1	99.459	5.123	5.095	9.005	81.089	9.005
157	0.05	96.099	2.315	2.225	-2.175	4.731	2.175
158	21.7	92.244	5.316	4.904	16.796	282.119	16.796
159	0	89.433	17.652	15.787	-15.787	249.214	15.787
160	43.2	85.785	91.227	78.259	-35.059	1229.150	35.059
161	116.4	84.092	501.643	421.841	-305.441	93294.490	305.441
162	106.8	85.570	71.565	61.238	45.562	2075.861	45.562
163	60.9	86.591	68.326	59.164	1.736	3.013	1.736
164	71.7	85.623	97.798	83.737	-12.037	144.891	12.037
165	214.6	85.144	164.465	140.032	74.568	5560.383	74.568
166	248.7	90.767	143.937	130.648	118.052	13936.306	118.052
167	2.6	97.662	30.633	29.917	-27.317	746.215	27.317
168	0	93.851	5.123	4.808	-4.808	23.115	4.808
169	0	90.048	2.315	2.085	-2.085	4.347	2.085
170	0	86.365	5.316	4.591	-4.591	21.078	4.591
171	0.8	82.798	17.652	14.615	-13.815	190.863	13.815
172	40.4	79.378	91.227	72.414	-32.014	1024.900	32.014

ตาราง 3.15 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
173	148.4	77.753	501.643	390.041	-241.641	58390.613	241.641
174	59.9	80.780	71.565	57.811	2.089	4.366	2.089
175	61.5	79.941	68.326	54.620	6.880	47.329	6.880
176	37.7	79.196	97.798	77.452	-39.752	1580.188	39.752
177	307.3	77.460	164.465	127.395	179.905	32365.969	179.905
178	194.2	87.265	143.937	125.606	68.594	4705.075	68.594
179	118.2	91.938	30.633	28.163	90.037	8106.589	90.037
180	0	93.223	5.123	4.776	-4.776	22.806	4.776
181	0	89.429	2.315	2.071	-2.071	4.288	2.071
182	0	85.755	5.316	4.559	-4.559	20.781	4.559
183	0.05	82.197	17.652	14.509	-14.459	209.071	14.459
184	35	78.754	91.227	71.845	-36.845	1357.570	36.845
185	196.3	76.909	501.643	385.809	-189.509	35913.796	189.509
186	57.7	81.994	71.565	58.679	-0.979	0.959	0.979
187	21.8	81.013	68.326	55.353	-33.553	1125.789	33.553
188	120.3	78.533	97.798	76.803	43.497	1891.992	43.497
189	228.6	80.327	164.465	132.110	96.490	9310.348	96.490
190	128.8	86.678	143.937	124.762	4.038	16.305	4.038
191	0.2	88.574	30.633	27.133	-26.933	725.387	26.933
192	6.1	84.930	5.123	4.351	1.749	3.060	1.749
193	0	81.653	2.315	1.891	-1.891	3.574	1.891
194	0	78.219	5.316	4.158	-4.158	17.289	4.158
195	26.4	74.895	17.652	13.220	13.180	173.706	13.180
196	72.6	72.801	91.227	66.415	6.185	38.260	6.185
197	73.3	72.743	501.643	364.910	-291.610	85036.317	291.610
198	169.6	72.717	71.565	52.040	117.560	13820.362	117.560
199	15.6	76.795	68.326	52.471	-36.871	1359.453	36.871
200	256.5	74.182	97.798	72.548	183.952	33838.155	183.952
201	229.4	81.916	164.465	134.722	94.678	8963.866	94.678
202	139.5	88.248	143.937	127.022	12.478	155.707	12.478
203	89.5	90.548	30.633	27.738	61.762	3814.598	61.762
204	0	90.643	5.123	4.643	-4.643	21.561	4.643
205	0	86.920	2.315	2.013	-2.013	4.050	2.013
206	0.1	83.315	5.316	4.429	-4.329	18.740	4.329
207	0	79.829	17.652	14.091	-14.091	198.563	14.091
208	69.8	76.449	91.227	69.742	0.058	0.003	0.058

ตาราง 3.15 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
209	168.5	76.150	501.643	382.003	-213.503	45583.607	213.503
210	244.3	80.066	71.565	57.299	187.001	34969.234	187.001
211	180.3	87.086	68.326	59.502	120.798	14592.072	120.798
212	68.4	91.155	97.798	89.147	-20.747	430.448	20.747
213	183.2	90.326	164.465	148.554	34.646	1200.359	34.646
214	414.1	94.412	143.937	135.894	278.206	77398.438	278.206
215	46.4	108.203	30.633	33.146	13.254	175.670	13.254
216	0	105.887	5.123	5.424	-5.424	29.424	5.424
217	0.7	101.665	2.315	2.354	-1.654	2.736	1.654
218	10.4	97.605	5.316	5.189	5.211	27.159	5.211
219	36.7	94.086	17.652	16.608	20.092	403.698	20.092
220	0.05	91.797	91.227	83.744	-83.694	7004.613	83.694
221	133	88.018	501.643	441.535	-308.535	95194.053	308.535
222	80.7	90.022	71.565	64.424	16.276	264.895	16.276
223	59.4	89.733	68.326	61.311	-1.911	3.653	1.911
224	29.6	88.545	97.798	86.595	-56.995	3248.464	56.995
225	76.4	86.125	164.465	141.645	-65.245	4256.866	65.245
226	360.9	85.774	143.937	123.461	237.439	56377.281	237.439
227	5.7	97.554	30.633	29.884	-24.184	584.855	24.184
228	0	93.825	5.123	4.806	-4.806	23.102	4.806
229	0.05	89.970	2.315	2.083	-2.033	4.134	2.033
230	0	86.240	5.316	4.584	-4.584	21.017	4.584
231	2	82.625	17.652	14.585	-12.585	158.376	12.585
232	89.8	79.210	91.227	72.261	17.539	307.609	17.539
233	221.8	79.645	501.643	399.531	-177.731	31588.424	177.731
234	28.5	85.689	71.565	61.323	-32.823	1077.356	32.823
235	19	83.305	68.326	56.919	-37.919	1437.849	37.919
236	74	80.592	97.798	78.817	-4.817	23.207	4.817
237	175.8	80.309	164.465	132.080	43.720	1911.456	43.720
238	297.5	84.371	143.937	121.442	176.058	30996.431	176.058
239	19.8	93.489	30.633	28.638	-8.838	78.119	8.838
240	0	90.484	5.123	4.635	-4.635	21.486	4.635
241	0.5	86.730	2.315	2.008	-1.508	2.275	1.508
242	0	83.117	5.316	4.418	-4.418	19.522	4.418
243	2.4	79.597	17.652	14.050	-11.650	135.730	11.650
244	54.3	76.292	91.227	69.599	-15.299	234.059	15.299

ตาราง 3.15 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
245	40.7	75.303	501.643	377.753	-337.053	113604.916	337.053
246	149.9	73.767	71.565	52.792	97.108	9430.023	97.108
247	57.6	76.933	68.326	52.565	5.035	25.347	5.035
248	160.3	76.067	97.798	74.391	85.909	7380.291	85.909
249	94.6	79.603	164.465	130.919	-36.319	1319.085	36.319
250	316.4	80.229	143.937	115.479	200.921	40369.245	200.921
251	15.8	90.283	30.633	27.656	-11.856	140.576	11.856
252	5.7	87.210	5.123	4.468	1.232	1.519	1.232
253	7.5	83.805	2.315	1.940	5.560	30.909	5.560
254	90.9	80.584	5.316	4.284	86.616	7502.377	86.616
255	0	81.018	17.652	14.301	-14.301	204.524	14.301
256	22.7	77.567	91.227	70.762	-48.062	2309.958	48.062
257	6.6	75.192	501.643	377.197	-370.597	137342.475	370.597
258	75.7	72.208	71.565	51.676	24.024	577.148	24.024
259	202.1	72.264	68.326	49.375	152.725	23324.837	152.725
260	111.1	77.704	97.798	75.993	35.107	1232.536	35.107
261	234.4	79.094	164.465	130.082	104.318	10882.333	104.318
262	230.8	85.693	143.937	123.344	107.456	11546.852	107.456
263	1.4	91.927	30.633	28.160	-26.760	716.109	26.760
264	63.7	88.190	5.123	4.518	59.182	3502.536	59.182
265	0	87.224	2.315	2.020	-2.020	4.079	2.020
266	0	83.575	5.316	4.443	-4.443	19.738	4.443
267	22.9	80.042	17.652	14.129	8.771	76.933	8.771
268	119.4	77.597	91.227	70.790	48.610	2362.952	48.610
269	133.5	79.341	501.643	398.010	-264.510	69965.582	264.510
270	5.7	81.631	71.565	58.419	-52.719	2779.309	52.719
271	49.6	78.403	68.326	53.570	-3.970	15.758	3.970
272	71.1	77.148	97.798	75.449	-4.349	18.917	4.349
273	213.3	76.850	164.465	126.391	86.909	7553.141	86.909
274	152.5	82.619	143.937	118.920	33.580	1127.598	33.580
275	0	85.615	30.633	26.227	-26.227	687.831	26.227
276	0	82.018	5.123	4.202	-4.202	17.653	4.202
277	0	78.535	2.315	1.818	-1.818	3.307	1.818
278	0	75.164	5.316	3.996	-3.996	15.965	3.996
279	36.8	71.900	17.652	12.692	24.108	581.210	24.108
280	74.2	70.310	91.227	64.141	10.059	101.174	10.059

ตาราง 3.15 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
281	363.1	70.364	501.643	352.975	10.125	102.516	10.125
282	105.2	82.725	71.565	59.202	45.998	2115.818	45.998
283	71.1	83.705	68.326	57.192	13.908	193.420	13.908
284	134.1	83.201	97.798	81.369	52.731	2780.549	52.731
285	34.6	85.397	164.465	140.448	-105.848	11203.871	105.848
286	118.8	83.284	143.937	119.877	-1.077	1.159	1.077
287	6.4	84.825	30.633	25.984	-19.584	383.550	19.584
288	0	81.527	5.123	4.176	-4.176	17.443	4.176
289	0.05	78.062	2.315	1.807	-1.757	3.089	1.757
290	0	74.710	5.316	3.972	-3.972	15.773	3.972
291	15.8	71.463	17.652	12.615	3.185	10.147	3.185
292	61.3	68.994	91.227	62.941	-1.641	2.694	1.641
293	177.2	68.543	501.643	343.840	-166.640	27768.971	166.640
294	55.5	73.045	71.565	52.275	3.225	10.404	3.225
295	76.1	72.220	68.326	49.345	26.755	715.835	26.755
296	117.2	72.300	97.798	70.707	46.493	2161.578	46.493
297	234.5	74.128	164.465	121.915	112.585	12675.356	112.585
298	105.3	80.897	143.937	116.441	-11.141	124.119	11.141
299	28.2	81.946	30.633	25.103	3.097	9.594	3.097
300	0	79.677	5.123	4.082	-4.082	16.660	4.082
301	0	76.278	2.315	1.766	-1.766	3.119	1.766
302	30.6	72.989	5.316	3.880	26.720	713.958	26.720
303	44	71.108	17.652	12.552	31.448	988.984	31.448
304	155.6	69.860	91.227	63.731	91.869	8439.911	91.869
305	228.5	73.406	501.643	368.235	-139.735	19525.999	139.735
306	250.2	79.946	71.565	57.213	192.987	37243.935	192.987
307	138.6	87.201	68.326	59.581	79.019	6243.960	79.019
308	167.1	89.471	97.798	87.501	79.599	6336.037	79.599
309	375.9	92.882	164.465	152.758	223.142	49792.495	223.142
310	81.2	105.077	143.937	151.245	-70.045	4906.344	70.045
311	77.2	104.327	30.633	31.959	45.241	2046.776	45.241
312	0.05	103.428	5.123	5.298	-5.248	27.546	5.248
313	0	99.268	2.315	2.298	-2.298	5.283	2.298
314	0	95.236	5.316	5.063	-5.063	25.630	5.063
315	44.3	91.331	17.652	16.122	28.178	794.021	28.178
316	74.9	89.437	91.227	81.591	-6.691	44.766	6.691

ตาราง 3.15 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
317	65.4	88.905	501.643	445.986	-380.586	144845.869	380.586
318	17.5	87.985	71.565	62.966	-45.466	2067.194	45.466
319	90.9	85.052	68.326	58.113	32.787	1074.989	32.787
320	221.5	85.340	97.798	83.460	138.040	19054.931	138.040
321	204.2	91.181	164.465	149.961	54.239	2941.875	54.239
322	63.6	96.099	143.937	138.322	-74.722	5583.355	74.722
323	17.3	94.868	30.633	29.061	-11.761	138.324	11.761
324	0	91.703	5.123	4.698	-4.698	22.069	4.698
325	0	87.901	2.315	2.035	-2.035	4.142	2.035
326	0	84.219	5.316	4.477	-4.477	20.043	4.477
327	0	80.653	17.652	14.237	-14.237	202.686	14.237
328	0.05	77.202	91.227	70.429	-70.379	4953.249	70.379
329	90.1	73.863	501.643	370.529	-280.429	78640.665	280.429
330	56.1	74.468	71.565	53.293	2.807	7.880	2.807
331	84.1	73.605	68.326	50.292	33.808	1143.004	33.808
332	110.8	73.964	97.798	72.335	38.465	1479.528	38.465
333	225.2	75.450	164.465	124.089	101.111	10223.485	101.111
334	153.2	81.763	143.937	117.687	35.513	1261.159	35.513
335	42.1	84.807	30.633	25.979	16.121	259.882	16.121
336	1.9	83.022	5.123	4.253	-2.353	5.537	2.353
337	0.9	79.580	2.315	1.843	-0.943	0.889	0.943
338	9.1	76.206	5.316	4.051	5.049	25.492	5.049
339	2.8	73.289	17.652	12.937	-10.137	102.754	10.137
340	179.1	70.197	91.227	64.039	115.061	13238.990	115.061
341	315.2	74.716	501.643	374.808	-59.608	3553.078	59.608
342	60.6	84.889	71.565	60.751	-0.151	0.023	0.151
343	36.1	83.893	68.326	57.320	-21.220	450.309	21.220
344	104.8	81.883	97.798	80.080	24.720	611.072	24.720
345	178.6	82.865	164.465	136.283	42.317	1790.692	42.317
346	264.4	86.959	143.937	125.166	139.234	19386.055	139.234
347	42.7	94.577	30.633	28.972	13.728	188.462	13.728
348	6.4	92.506	5.123	4.739	1.661	2.759	1.661
349	0	88.954	2.315	2.060	-2.060	4.242	2.060
350	30.8	85.242	5.316	4.531	26.269	690.042	26.269
351	7.3	82.959	17.652	14.644	-7.344	53.930	7.344
352	178.7	79.748	91.227	72.752	105.948	11225.042	105.948

ตาราง 3.15 (ต่อ)

เดือน	ข้อมูล (Y)	ค่าแนวโน้ม (T)	ดัชนีฤดูกาล (S)	ค่าพยากรณ์ $\hat{Y} = T \times S$	$e = Y - \hat{Y}$	e^2	$ e $
353	286.4	83.941	501.643	421.082	-134.682	18139.326	134.682
354	101.2	92.588	71.565	66.261	34.939	1220.762	34.939
355	19.4	93.069	68.326	63.590	-44.190	1952.788	44.190
356	150.2	90.049	97.798	88.066	62.134	3860.672	62.134
357	247.6	92.696	164.465	152.452	95.148	9053.097	95.148
358	324.8	99.407	143.937	143.084	181.716	33020.756	181.716
359	7.4	109.191	30.633	33.449	-26.049	678.533	26.049
360	0	105.139	5.123	5.386	-5.386	29.010	5.386
361	0	100.899	2.315	2.336	-2.336	5.458	2.336
362	0	96.791	5.316	5.145	-5.145	26.474	5.145
363	193.8	92.813	17.652	16.383	177.417	31476.752	177.417
364	0	97.216	91.227	88.687	-88.687	7865.461	88.687
365	398.7	93.221	501.643	467.638	-68.938	4752.493	68.938
366	30.2	106.337	71.565	76.101	-45.901	2106.859	45.901
367	48.8	103.335	68.326	70.605	-21.805	475.456	21.805
368	53.8	101.219	97.798	98.990	-45.190	2042.111	45.190
369	150.1	99.381	164.465	163.446	-13.346	178.126	13.346
370	290.3	101.702	143.937	146.387	143.913	20710.882	143.913
371	22.9	109.920	30.633	33.672	-10.772	116.034	10.772
372	12.3	106.482	5.123	5.455	6.845	46.856	6.845
รวม						3447501.009	21480.965