

MODEL AND ALGORITHM CONSTRUCTIONS
FOR LOCATION PROBLEMS

SITTIPONG DANTRAKUL

DOCTOR OF PHILOSOPHY
IN MATHEMATICS

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright© by Chiang Mai University
All rights reserved

GRADUATE SCHOOL
CHIANG MAI UNIVERSITY
APRIL 2016

**MODEL AND ALGORITHM CONSTRUCTIONS
FOR LOCATION PROBLEMS**

SITTIPONG DANTRAKUL

**A THESIS SUBMITTED TO CHIANG MAI UNIVERSITY IN PARTIAL
FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY**

IN MATHEMATICS

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright© by Chiang Mai University
All rights reserved

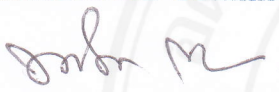
**GRADUATE SCHOOL, CHIANG MAI UNIVERSITY
APRIL 2016**

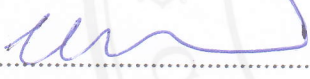
MODEL AND ALGORITHM CONSTRUCTIONS
FOR LOCATION PROBLEMS

SITTIPONG DANTRAKUL

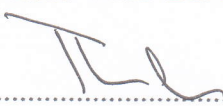
THIS THESIS HAS BEEN APPROVED TO BE A PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY
IN MATHEMATICS

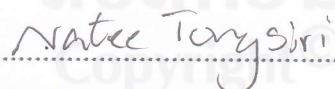
Examination Committee :

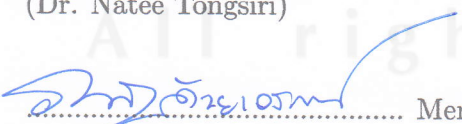

..... Chairman
(Dr. Panida Chamchang)


..... Member
(Assoc. Prof. Dr. Chulin Likasiri)


..... Member
(Assoc. Prof. Dr. Radom Pongvuthithum)


..... Member
(Asst. Prof. Dr. Thanasak Mouktonglang)

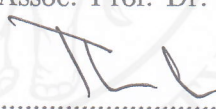

..... Member
(Dr. Natee Tongsiri)


..... Member
(Acting Capt. Dr. Panat Guayjarernpanishk)

Advisory Committee :


..... Advisor
(Assoc. Prof. Dr. Chulin Likasiri)


..... Co-advisor
(Assoc. Prof. Dr. Radom Pongvuthithum)


..... Co-advisor
(Asst. Prof. Dr. Thanasak Mouktonglang)

18 April 2016

Copyright © by Chiang Mai University

ACKNOWLEDGEMENT

I would like to express my sincere gratitude to my supervisor, Assoc. Prof. Dr. Chulin Likasiri, for her initial idea, guidance and encouragement which enabled me to carry out my study successfully. I feel glad and honored to work with her.

This work contains a number of improvements based on comments and suggestions provided by Assoc. Prof. Dr. Radom Pongvuthithum and Asst. Prof. Dr. Thanasak Mouktonglang. It is my pleasure to express my sincere thanks to them for their generous assistance. Thanks are also due to Wiriya Sungkhaniyom and Dr. Richard Brown for their proofreading help. Thanks are also extended to all my best friends at Chiang Mai University for their help, friendship and moral support. Moreover, I gratefully appreciate my beloved family for their love and encouragement.

Finally, I greatly appreciate the Human Resources Development in Science Project (Science Achievement Scholarship of Thailand SAST) for financial support during my Ph.D. study.

Sittipong Dantrakul

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright© by Chiang Mai University
All rights reserved