

Chapter 5 Discussion and Conclusion

5.1 Discussion and Conclusion

The model of Sanguansak gave the profile shown that the high brightness temperature in the direction nearby the galactic longitude of zero, which it reflects the high magnetic field strength in the galactic center region and the regular field along the spiral will perpendicular to the line of sight. And it declines for the far galactic longitude from zero toward $\pm 90^\circ$, which it reflects the lower field strength in the galactic disk region and the regular field often parallel to the line of sight as shown in Figure 5.1.

The result of this work, we have obtained the optimized parameters $R_0 = 11.9$ kpc, $R_1 = 1.7$ kpc, $R_2 = 9.35$ kpc, $p = -6.8^\circ$ and $C = 0.8$. It means that the field strength is eminent greater than Synchrotron Emission Model while observed through the galactic central region. In the spiral arm region, the field strength has a frequency of sinusoidal component more than Bisymmetric Spiral Model but has nearby phase shift. And in the interarm region, the field strength has at least as shown in Figure 5.2.

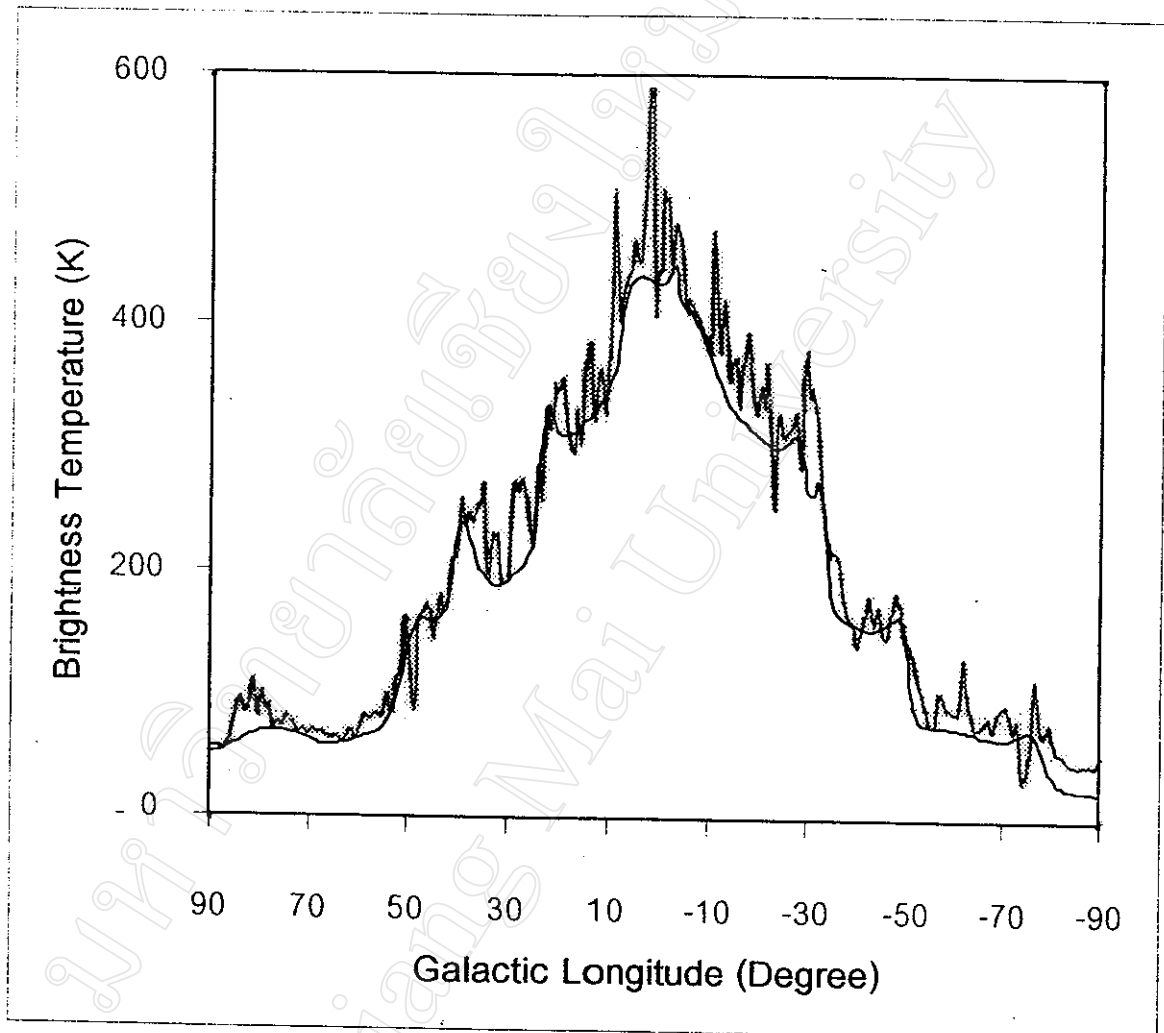


Figure 5.1 The calculated brightness temperature from Synchrotron Emission Model vary as the galactic longitudes in the range of -90° to 90° .

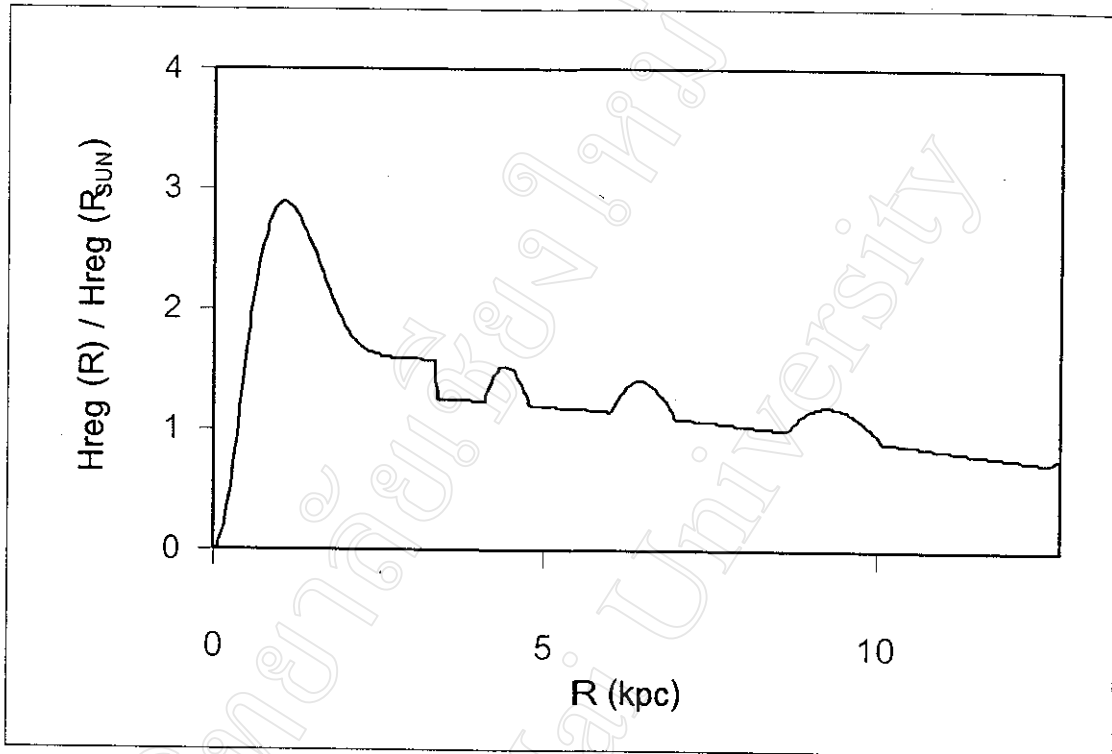


Figure 5.2 The adapted model with the optimized parameters (for $\theta = 0^\circ$).

The profile is often consecutive with the observed brightness temperatures almost the galactic longitude. Because of the sinusoidal component from Bisymmetric Spiral Model pushes up the field in the spiral arm region, which aligns along the arm and perpendicular to the line of sight. It makes the profile higher than Synchrotron Emission Model to good fit as shown in Figure 5.3. But at the longitude in the range of -10° to -5° , the profile is not a good fit. The small error is that due to the some position of the spiral arm pattern is not suitable.

We conclude that the adapted model gives a good fit and can explain the magnetic field of Milky Way Galaxy considerably.

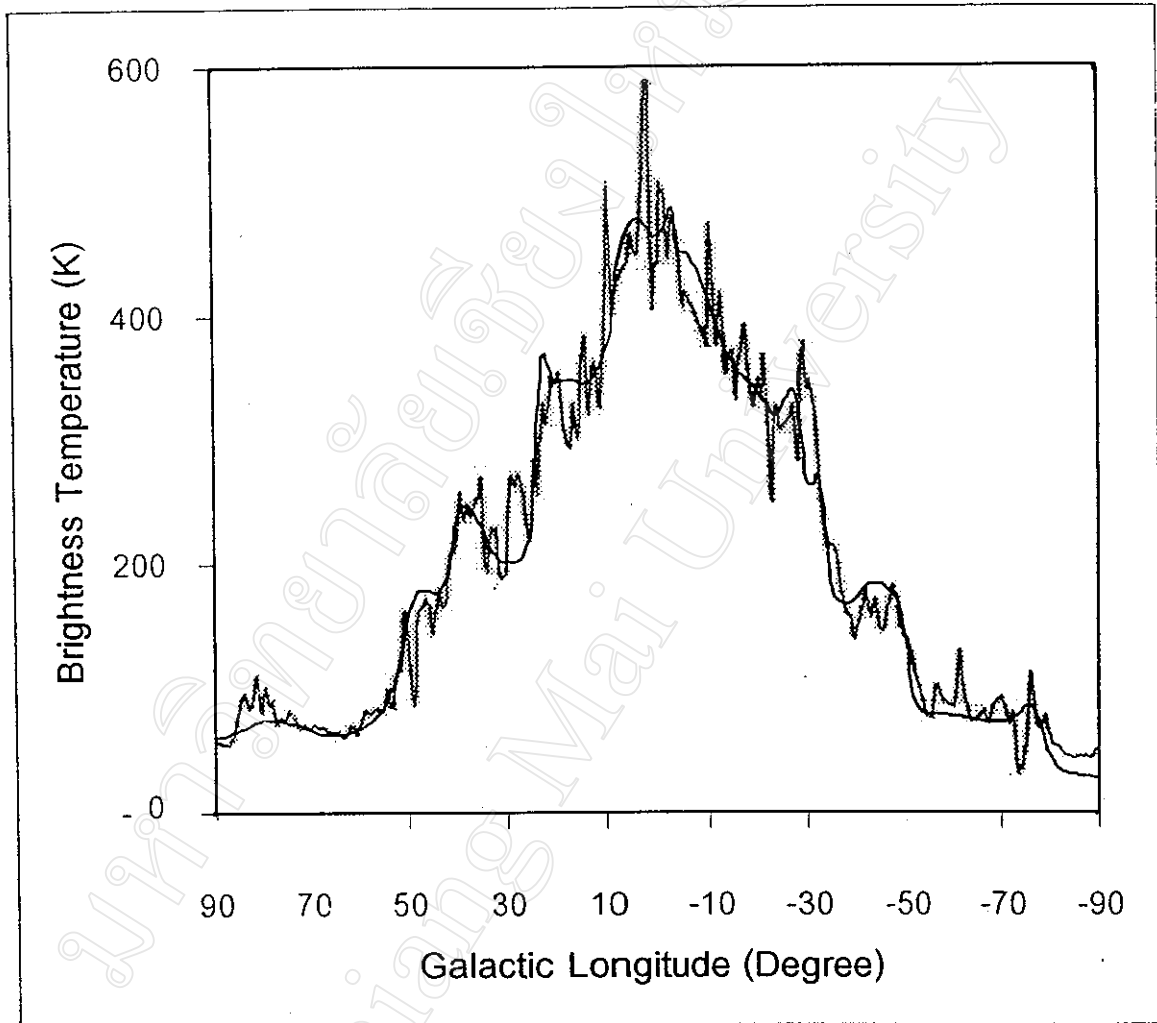


Figure 5.3 The calculated brightness temperature from the Adapted Model vary as the galactic longitudes in the range of -90° to 90° .

5.2 Future Work

Due to the profile is not a well fit at the longitude in the range of -10° to -5° that concerning with the spiral structure of the galaxy. We should obtain the new studies of the galactic structure data to optimize the fitting of the profile.