CHAPTER I

INTRODUCTION

This chapter describes the rationale for study, the purpose of the study, and scope of the study.

1. Rationale for the Study

A parabolic dish concentrates the incoming solar radiation to a point. An insulated cavity containing tubes or some other heat transfer device is placed at this point absorbing the concentrated radiation and transferring it to a gas. Parabolic dishes must be tracked about two axes (azimuth angle and altitude angle).

High-concentration solar requires the sun to be tracked with great accuracy for maximum output voltage. The accuracy required depends on the specific characteristics of the concentrating system being analyzed, in general, the higher system concentration need the higher accuracy tracking system. The current trend in solar concentrator tracking system is to use an open-loop local controller that computes the direction of the solar vector based on geographical location and time. But it is not enough accuracy because it has error from computing the sun's position, mechanical, controller systems and installation. The solar tracking is stochastic problem with dynamic parameters, so approximate method has been use to solve these problem.

To overcome these problems, close-loop controller system that using genetic algorithms are applied in this research because they are powerful and broadly applicable stochastic search and optimization techniques based on principles from evolution theory that can find better sun's position.

2. Purpose of the Study

The purposes of this research are to:

1. Develop a Solar Tracking Machine Model (STMM) using Genetic Algorithms to find the direction of the solar vector.

2. Find suitable parameters of Genetic Algorithms of STMM.

3. Scope of the Study

1. Define the solution space based on location and time using equation of time given by Woolf (1968).

2. Apply a simple genetic algorithm for increase the performance of STMM.

3. Research experimental is located on faculty of engineering, Naresuan University, Phitsanulok, Thailand.