Yield Management is a combination of methods and tools in order to optimize the revenue. From the most basic industry to the larger industries, in which the resources must be utilized before the expiration date, yield management has proven to be a booster in optimizing their revenue. This thesis represents a step towards meeting that need. In this thesis, the yield management problem has been analyzed and modeled.

Chapter 1 provides an overview of yield management. In this chapter, the process of yield management has been discussed. Major aspects of yield management are segmentation, forecasting, and optimization. The yield management is based on three conditions i.e. fixed capacity, perishable inventory, and price discrimination. An introduction to optimization has been provided in this chapter, as it forms the basis of present work. Simulation has also been introduced in this chapter.

In chapter 2, genetic algorithm has been discussed. Genetic algorithm is an evolutionary approach based on the principle of Darwin’s theory of natural evolution. There are a number of applications of genetic algorithm, and one of them is optimization. It has been proved in this chapter that yield management is perfect candidate for genetic algorithm to be applied. This chapter explains the various steps involved in genetic algorithm.

In chapter 3, the objectives of research have been stated. The objectives of this thesis include optimizing revenue, analyze the behavior of genetic algorithm in yield management, analyze the impact of various arrival patterns, prevent the premature convergence, and estimate the cancellations and overbooking in yield management. This chapter formulates the problem for achieving these objectives. An introduction to MATLAB has also been provided.

Chapter 4 presents the related literature. This chapter presents the literature regarding yield management and its various aspects. Literature related to the various applications of yield management has also been discussed. Various solutions for the yield management from the literature have been looked upon. Research on simulation from the literature has also been looked upon. In the end, the use of evolutionary approaches, especially genetic algorithm has also been considered from the literature.
In chapter 5, simulators for solving the yield management problem have been designed. The first simulator has been designed using genetic algorithm. The simulator has been explained, along with various parameters to be used in genetic algorithm. The representation, encoding schemes, crossover, replacement and termination to be used by the simulator has been discussed in this chapter. Another simulator using linear programming has also been designed for solving the yield management problem. Both the simulators have been run for the different time-slices and their results have been compared. The first simulator has also been executed for the various combinations of the population sizes and generations. Different combinations of operators have been tried out in lurch to find the best combination for using genetic algorithm in yield management.

In chapter 6, the simulators for the modeling of various arrival patterns have been designed. The three arrival patterns have been assumed in this chapter and they are normal, beta and uniform probability distribution. The results have been compared for each of the arrival pattern. The various combinations of operators have been used in an attempt to identify the best combination for each of arrival pattern.

Chapter 7 presents the simulators for preventing the premature convergence in genetic algorithms. Three simulators have been designed in this chapter using elitism, judgment day technique and packing technique. The purpose of elitism is to improve the convergence, while that of judgment day and packing is to prevent the premature convergence. The results have been compared in each of the cases with those cases when these techniques are not applied. The techniques are compared with each other also.

Chapter 8 deals with the concept of cancellations and overbooking in yield management. This chapter provides the solution for these problems. Three simulators have been designed in this chapter for the cancellation, fixed overbooking and random overbooking. The first simulator is used to estimate the cancellations in yield management problem. The second simulator is based on the first simulator and estimate revenue with overbooking which is fixed. The third simulator presents the random overbooking. The results of the two overbooking simulators have been compared.

The conclusion and future scope has been presented in chapter 9. In the end, Appendix lists out the code modules in MATLAB and C for different simulators using Genetic algorithm used for implementation of the research work carried out in previous chapters.