# Abstract

Many facilities like airports, train stations, shopping complexes, etc. also provide parking lots for vehicles. At most parking lots, especially in developing economies like India, multiple types of vehicles, which differ significantly in their turning abilities and space requirements, arrive. Also, vehicles that arrive demand different types of parking services; for example, some may demand long-term parking while others may demand short-term parking. The following questions are relevant while designing the parking lots: (i) how should the total capacity be distributed among the different vehicle types and service classes, (ii) how big (in terms of parking capacity) should the parking lot / lots be, and (iii) how much should the parking fees be?

The answers to these questions will depend on what the transport planner (or analyst) wishes to achieve. For example, in order to answer the question (i), one may decide that service quality should be the guiding principle and probability of not finding space in the parking lot (for a given total capacity) should be minimized. However, the same question can be answered by finding the distribution (for a given total capacity and parking fees) that minimizes the revenue lost. In this work, mathematical programming (MP) formulations for various types of objectives are developed and solved.