

Oral presentation: 129

Modelling and optimizing the profit of public transportation bus

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In this research work, we develop a mathematical model that can be used to optimize the profit from a bus service between two cities, while taking into account the factors that affect the profit. The factors that we considered were the departure time between two buses on the route, the average speed of a bus between two stops and the ticket price. A deterministic model was formulated for the profit using a *Beverton-halt* type formula consisting of the above three variables. The optimal profit was calculated under the constraint that a bus service should get a minimum profit to maintain the bus service. Several simplifying assumptions were also made. They are i. Bus service last for 12 hr from (6.00 a.m to 6.00 p.m) ii. Buses travel at a constant speed iii. Fuel cost is the only cost incurred. Optimal solutions were obtained using *Matlab* simulations changing the parameters simultaneously. This research is a fundamental model that takes into account the factors that affect the lasting of a bus service. We conclude that, in order to supply service to many passengers, the buses should travel at a faster speed and that the departure time difference should be minimized.

Keywords: Beverton-halt formula, optimization, simulations