# Modelling Autonomous Car Allocation as a Dynamic Market Pricing Problem

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## Research Proposal:

### Introduction:

The recent advances in the field of autonomous transportation have created demand for solving many practical problems in order to efficiently integrate this new technology in our lives. The US secretary of transporation has estimated that by 2025 autonomous vehicles will be in use worldwide. It could be the case that major companies like Google, Uber & Tesla will hold large scale fleets of vehicles and make them available as a service. Another option is that people will make their own private vehicles, while not in use, available for use by other drivers. In any case the problem of allocating autonomous vehicles to passengers will be of great concern in the near future.

### Our Goal:

Our first goal will be to model the problem of autonomous vehicle allocation as a special case of known problems in the field of algorithmic game theory. Thus using the major results in the field of algorithmic game theory in order to advance the field of autonomous vehicles. We will then examine different sets of assumptions, constraints and optimizations regarding this allocation problem and attempt to find optimal solutions for some special cases.

### Measuring Performance of Our Algorithm:

In the recent google hashcode competition more than 60,000 paricipants attempted to solve this problem. We will measure our algorithm against the top results in this competition.

# References


[1] **The FedEx Problem** - https://homes.cs.washington.edu/~kgoldner/papers/fedex.pdf

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[3] **Makespan Minimization via Posted Prices** - https://arxiv.org/abs/1705.01965

[4] **Efficient Empirical Revenue Maximization in Single-Parameter Auction Environments** - https://arxiv.org/abs/1610.09976

[5] **Optimal Analysis of an Online Algorithm for the Bipartite Matching Problem on a Line** - https://arxiv.org/abs/1803.07206

[6] **Online Stochastic Matching: Online Actions Based on Offline Statistics** - https://arxiv.org/abs/1007.1673