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# Dynamical macroscopic re-balancing of ride-hailing vehicles

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# **Dynamical macroscopic re-balancing of ride-hailing vehicles**

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## **Abstract**

Different types of ride-hailing services have experienced increasing popularity. To provide good service for the customers, idle vehicles need to be located in areas where the demand is or is predicted to be high. Due to the complexity of city-traffic systems, aggregate dynamical models are often utilized both for modeling and the development of appropriate control strategies. In this work, we present a macroscopic dynamical model for ride-hailing vehicles in city traffic, together with some control strategies for re-balancing. The proposed model is a compartment model. Each compartment corresponds to a region in the city, and its state-space consists of both idle and occupied vehicles, together with the request queue within each region. We categorize the equilibrium of the model, and perform simulation with two different control strategies, a classical proportional controller and a non-linear proportional controller.

## **Keywords**

Ride-hailing, Macroscopic modelling, Control