

# TRAFFIC RECONSTRUCTION USING AUTONOMOUS VEHICLES

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**ABSTRACT.** We consider a partial differential equation - ordinary differential equation system to describe the dynamics of traffic flow with autonomous vehicles. In the model the bulk flow is represented by a scalar conservation law, while each autonomous vehicle is described by a car following model. The autonomous vehicles act as tracer vehicles in the flow and collect measurements along their trajectory to estimate the bulk flow. The main result is to prove theoretically and show numerically how to reconstruct the correct traffic density using only the measurements from the autonomous vehicles.

**Keywords:** Scalar conservation laws, PDE-ODE systems, Density reconstruction, Traffic flow models

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