

## SEMINAR

**Tuesday, March 14, 2017**  
**10:15 am – 12:00 pm**  
**Seminar Room 4080 AIR Building**

### **FUNDAMENTAL DIAGRAM CALIBRATION USING TRAJECTORIES OF PROBE VEHICLES**

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#### **Abstract**

The fundamental diagram (FD), also known as flow--density relation, is one of the most important concepts in traffic flow theory. It would be valuable if an FD could be calibrated by GPS-equipped probe vehicles; since they can continuously collect data from wide spatiotemporal area compared to traditional fixed sensors. This study proposes methods for calibrating an FD from trajectories of sampled vehicles. We formulate a method that identifies values of a free-flow speed and a critical density of a triangular FD, while it relies on exogenous assumptions on FD's functional form and a value of its jam density. Then, a heuristic algorithm for FD calibration in actual traffic environment is developed based on the proposed method. It was validated using actual traffic data on highway. The results suggested that the proposed methods can calibrate an FD under certain conditions. It implies that FDs in road sections on which congestion happens frequently can be calibrated using probe vehicles, if probe vehicle data were collected for a long period.

*Dr. Toru Seo is a postdoctoral researcher at Tokyo Institute of Technology where he received Dr.Eng. degree in 2015. His research interests include transportation data collection, estimation, and application of traffic flow theory. He received the Best Paper Award at the IEEE 18th International Conference on Intelligent Transportation Systems, Kometani-Sasaki Award for Dissertation, and several Japanese awards.*

*Website: [http://www.csis.u-tokyo.ac.jp/~t.kusakabe/index\\_en.html](http://www.csis.u-tokyo.ac.jp/~t.kusakabe/index_en.html)*

*Google Scholar: <https://scholar.google.com/citations?user=4Kt60z4AAAAJ&hl=ja>*