**Estimating Traffic Flow Rate on Freeways from Probe Vehicle Data and Fundamental Diagram**

Abstract

Traffic flow rate information obtained from loop detectors is important for many traffic management applications. Given the installation and maintenance costs of such detectors is high, many transportation agencies are shifting to probe vehicle based traffic data. However, estimating traffic flow rates from probe vehicle data remains critical. This paper attempts to estimate traffic flow rates by utilizing a well-calibrated fundamental diagram in combination with the traffic speed information obtained from the probe vehicle. Different single-regime fundamental diagrams and aggregation intervals of the probe vehicle data are investigated in search of the combination that provides the most accurate estimate of flow rates. The results suggest that flow rates are best estimated by using fundamental diagram developed by Van Aerde. Moreover, estimates of flow rates during congested periods are found to be more accurate than free-flow periods.

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