

Paper presented at the 9th Annual International IEEE ITS Conference, Toronto, Canada, September 17-20, 2006.

A ramp queue length estimation algorithm

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Abstract: The number of vehicles included in a metered motorway ramp or an urban signalized link at any time is a valuable information for real-time control. A Kalman Filter is employed to produce reliable estimates of this quantity based on real-time measurements of flow and occupancy provided by three loop detectors. The resulting vehicle-count estimator is tested via microscopic simulation for a variety of metered ramp scenarios and traffic conditions. The simulation investigations indicate a robust estimation performance with low calibration effort needed, which facilitates easy applicability of the method.