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Continuous and discrete trajectory models for dynamic traffic assignment. (English)

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Summary: A continuous trajectory model is presented in which transportation networks are represented as topological constructs. The general formulation enhances existing analytic dynamic traffic assignment models by incorporating continuous single-link traffic flow models in a general, coherent, and relatively intuitive manner. Specific exact formulation based on a simplified kinematic wave traffic flow model with physical queues is presented as well.

A discrete trajectory model is proposed as an approximation of the continuous model. The discrete model provides wide flexibility in choosing the level of aggregation with respect to time intervals, ranging from several hours, as typical in current practice of long-term travel forecasting models, to one second or less, as in microscopic simulations. An algorithm to find discrete approximate solutions is presented as well as accuracy measures to evaluate them. The effect of time resolution on model performance is examined by a numerical example.

MSC:

90B06 Transportation, logistics and supply chain management
90B10 Deterministic network models in operations research
90B20 Traffic problems in operations research

Keywords:

Dynamic traffic assignment; network-loading; continuous trajectory models; trajectory discretization

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