

Payne-Whitham型宏观交通流模型波动特性

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摘要 宏观交通流模型将交通流比拟成流体流,通过整体变量如交通流量、平均车速以及交通密度来研究其整体性质,得到了越来越多的肯定.文章采用波前展开的方法,研究Payne-Whitham型宏观交通流模型描述扰动沿交通流波动的特性,同时给出了相应的稳定性条件.最后利用Pad $\{\rm \acute{e}\}$ \$逼近法进行数值仿真,得到的结果与理论分析相一致.

关键词 [宏观交通流模型](#),[波前展开](#),[稳定条件](#).

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Wave Propagation of the Payne-Whitham-Type Macroscopic Traffic Flow Models

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Abstract In macroscopic traffic flow models, the traffic flow is treated as the fluid flow and the collective variables-flow rate, traffic density and traffic speed are used to describe it. In this paper, the Payne-Whitham-type macroscopic model is discussed for the properties of describing the propagation of perturbations along the equilibrium traffic flow through the wavefront expansion techniques. Furthermore, the traffic flow stability criterions are derived. Numerical simulations based on a Pad $\{\rm \acute{e}\}$ \$ approximation of this expansion are done in the end of this paper and results show that propagation of perturbations on traffic flow speed conforms to the theoretical analysis.

Key words [Macroscopic traffic flow models](#) [wavefront expansion](#) [stabilities](#).

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