

One-Dimensional Traffic Model to Consider Priority of the Stochastic Deceleration

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Abstract: A one-dimensional cellular automaton model of traffic flow is proposed to introduce the different delay probabilities in the steps of rules and the stochastic deceleration prior to the deterministic one when the anticipation velocity of vehicle is larger than the headway. The fundamental diagram shows the capacity of road more approaches to the observed data compared with that by the NaSch model. Moreover, the model is able to reproduce the complicated behavior of the real traffic, such as the metastability state, the separation of different phases and the effect of hysteresis. It is concluded that the order arrangement of the stochastic deceleration and deterministic acceleration has indeed remarkable effect on traffic flow and the modification presented in this paper is reasonable and realistic.

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Key words: traffic flow, cellular automaton, fundamental diagram

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