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Jian Zhang, Tie-Qiao Tang, Shao-Wei Yu

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ACCEPTED MANUSCRIPT

An improved car-following model accounting for the preceding car's taillight

Jian Zhang[a], Tie-Qiao Tang[a*], Shao-Wei Yu[b]

a) School of Transportation Science and Engineering, Beijing Key Laboratory for Cooperative Car Infrastructure Systems and Safety Control, Beihang University, Beijing 100191, China

b) School of Information Engineering, Chang'an University, Xi'an 710064, China

Abstract: During the deceleration process, the preceding car's taillight may have influences on its following car's driving behavior. In this paper, we propose an extended car-following model with consideration of the preceding car's taillight. Two typical situations are used to simulate each car's movement and study the effects of the preceding car's taillight on the driving behavior. Meanwhile, sensitivity analysis of the model parameter is in detail discussed. The numerical results show that the proposed model can improve the stability of traffic flow and the traffic safety can be enhanced without a decrease of efficiency especially when cars pass through a signalized intersection.

Keyword: Car-following model, taillight, signalized intersection, traffic safety.

1. Introduction

To describe the car's motions and study the properties of traffic flow and driving behavior, various car-following models have been developed since the first car-following model [1] occurred more than sixty years ago. For example, Newell [2] developed a car-following model with a simple rule. Bando et al. proposed an optimal velocity (OV) model that can reproduce many traffic phenomena (e.g., stop-and-go) [3]. Later, the OV

* corresponding author: Tie-Qiao Tang (T.Q. Tang); email: tieqiaotang@buaa.edu.cn

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