ABSTRACT

As one of the main theories to analyze the urban road travel system, traffic assignment theory can help traffic managers understand the evolution pattern of urban road networks and provide a theoretical basis for the efficient operation of the traffic system. The day-to-day (DTD) traffic assignment model describes the evolution of traffic flow in units of days, which is significant for grasping the regular traffic flow pattern. The core of the past day-to-day model is the traveler's perception and choice. With the emergence and popularization of the advanced traveler information system (ATIS), ATIS provides convenience for travelers on urban roads. The complexity of behavior and road network state has an important impact on the evolution of network traffic flow.

The control measures adopted by traffic managers are an essential consideration for road travelers' daily travel. The fees charged in specific areas in the road network and the closure or opening of roads at specific nodes will affect travelers' choices based on travel costs. At the same time, the analysis of travelers' travel choices also needs to consider subjective factors, such as choice and learning costs. These properties are reflected in the bounded rationality (BR) theory. This paper establishes a daily traffic evolution model in the ATIS environment, incorporates road toll into the basic model, conducts system stability analysis, and discusses the reversibility or reversibility of network changes under this model. At the same time, this paper considers the evolution of network traffic flow under the two road events of road toll and road network change when the traveler has bounded rationality and conducts a numerical analysis.

This paper is a meaningful theoretical study considering BR and ATIS models, which will provide theoretical guidance and possible research directions for traffic management departments to optimize traffic systems.

Keywords: Bounded Rationality, Day-to-day models, Road Pricing, Advanced Traveler Information System