

Application of complex networks theory in urban traffic network researches

ABSTRACT

Complex network theory is a multidisciplinary research direction of complexity science which has experienced a rapid surge of interest over the last two decades. Its applications in land-based urban traffic network studies have been fruitful, but have suffered from the lack of a systematic cognitive and integration framework. This paper reviews complex network theory related knowledge and discusses its applications in urban traffic network studies in several directions. This includes network representation methods, topological and geographical related studies, network communities mining, network robustness and vulnerability, big-data-based research, network optimization, co-evolution research and multilayer network theory related studies. Finally, new research directions are pointed out. With these efforts, this physics-based concept will be more easily and widely accepted by urban traffic network planners, designers, and other related scholars.

Keyword: Complex network theory; Urban traffic network; Spatial network; Multilayer network