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Enhancing Transport Efficiency by Hybrid Routing Strategy

J.-Q. Dong, Z.-G. Huang, Z. Zhou, L. Huang, Z.-X. Wu, Y. Do, Y.-H. Wang

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Traffic is essential for many dynamic processes on real networks, such as internet and urban traffic systems. The transport efficiency of the traffic system can be improved by taking full advantage of the resources in the system. In this paper, we propose a dual-strategy routing model for network traffic system, to realize the plenary utility of the whole network. The packets are delivered according to different "efficient routing strategies" [Yan, et al, Phys. Rev. E 73, 046108 (2006)]. We introduce the accumulate rate of packets, $\{\eta\}$ to measure the performance of traffic system in the congested phase, and propose the so-called equivalent generation rate of packet to analyze the jamming processes. From analytical and numerical results, we find that, for suitable selection of strategies, the dual-strategy system performs better than the single-strategy system in a broad region of strategy mixing ratio. The analytical solution to the jamming processes is verified by estimating the number of jammed nodes, which coincides well with the result from simulation.

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