

## Optimization of Traffic Agent Allocation for Minimizing Bus Rapid Transit Cost on Simplified Jakarta Network

**Authors :** Gloria Patricia Manurung

**Abstract :** Jakarta Bus Rapid Transit (BRT) system which was established in 2009 to reduce private vehicle usage and ease the rush hour gridlock throughout the Jakarta Greater area, has failed to achieve its purpose. With gradually increasing the number of private vehicles ownership and reduced road space by the BRT lane construction, private vehicle users intuitively invade the exclusive lane of BRT, creating local traffic along the BRT network. Invaded BRT lanes costs become the same with the road network, making BRT which is supposed to be the main public transportation in the city becoming unreliable. Efforts to guard critical lanes with preventing the invasion by allocating traffic agents at several intersections have been expended, lead to the improving congestion level along the lane. Given a set of number of traffic agents, this study uses an analytical approach to finding the best deployment strategy of traffic agent on a simplified Jakarta road network in minimizing the BRT link cost which is expected to lead to the improvement of BRT system time reliability. User-equilibrium model of traffic assignment is used to reproduce the origin-destination demand flow on the network and the optimum solution conventionally can be obtained with brute force algorithm. This method's main constraint is that traffic assignment simulation time escalates exponentially with the increase of set of agent's number and network size. Our proposed metaheuristic and heuristic algorithms perform linear simulation time increase and result in minimized BRT cost approaching to brute force algorithm optimization. Further analysis of the overall network link cost should be performed to see the impact of traffic agent deployment to the network system.

**Keywords :** traffic assignment, user equilibrium, greedy algorithm, optimization

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