

Offset Dependent Uniform Delay Mathematical Optimization Model for Signalized Traffic Network Using Differential Evolution Algorithm

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Abstract : A new concept of uniform delay offset dependent mathematical optimization problem is derived as the main objective for this study using a differential evolution algorithm. To control the coordination problem, which depends on offset selection and to estimate uniform delay based on the offset choice in a traffic signal network. The assumption is the periodic sinusoidal function for arrival and departure patterns. The cycle time is optimized at the entry links and the optimized value is used in the non-entry links as a common cycle time. The offset optimization algorithm is used to calculate the uniform delay at each link. The results are illustrated by using a case study and are compared with the canonical uniform delay model derived by Webster and the highway capacity manual's model. The findings show new model minimizes the total uniform delay to almost half compared to conventional models. The mathematical objective function is robust. The algorithm convergence time is fast.

Keywords : area traffic control, traffic flow, differential evolution, sinusoidal periodic function, uniform delay, offset variable

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