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Abstract

Different factors affect the process of choosing the appropriate traffic signal controller to solve the traffic conflict on an intersection. Important factors are; number of phases and vehicles arrival rates. Sequence of phases, timings of traffic signals and length of cycle are the most important parameters that all traffic signal controllers aim to optimize one or more of them. One of the major performance measures of traffic signal controller is the average waiting time of vehicles. To compare different kinds of traffic signal controllers, a discrete event simulation model of traffic signal controller on a single intersection is developed using Matlab/Simulink/Simevents. In this paper, three algorithms are proposed to reduce the average waiting time at intersections. The proposed algorithms are compared to the base-line fixed-time controller through extensive simulation experiments. All the proposed algorithms outperforms the base-line algorithm when there is a high variance on the traffic flow. One of the proposed algorithms that adapts both green intervals and cycle length, AW VariableC, outperforms other algorithms, including base-line, under all conditions, but this is on the expense of more computational overhead and more input parameters.

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Index Terms

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Keywords

Traffic-control Simulation Matlab/Simulink Fixed green-interval controller
Adaptive green-interval algorithm