Applying Matsuoka Neuronal Oscillator in Traffic Light Control of Intersections

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Abstract

The objective of this thesis is to implement Matsuoka Oscillators into a traffic control system at an isolated intersection in order to allocate the duration of green time depends on the dynamic traffic demands. The oscillator is a model of central pattern generators (CPG) which has been successfully used in various humanoid robotic applications. A Matsuoka Oscillator was chosen in this project because of its stable and predictable rhythmic outputs. In this thesis, the inputs of a Matsuoka Oscillator are the number of vehicles, and the outputs of the model are the duration of green time in the next phase. The purpose of this thesis is to study how the unbalanced traffic demand conditions affect the control system with Matsuoka Oscillators. The results of this research are compared with the fixed time control system. The expectation of this thesis is to make the time interval more fixable and reduce the delay time in order to balance the traffic condition at the isolated traffic intersection.

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Table of contents

List of figures

List of tables