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Mechanical Engineering Department

Development of Driving Cycle for Vehicles Fuel Consumption Simulation

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Abstract:

Every type approval tests of vehicles are based on standard driving cycles. The evaluation of vehicles fuel consumption and their exhaust emissions by means of simulation are also performed based on driving cycles. These driving cycles are mainly developed in industrial developed countries and unfortunately before the current study, no act has managed to develop such driving cycles for our country, Iran.

Development of Tehran driving cycle in order to simulate fuel consumption and exhaust emissions is the object of this project. Firstly, data acquisition has been performed in real-world driving conditions, using the appropriate measurement system. Then with data analysis of gathered data of different vehicles including passenger cars, taxies, buses and minibuses, the representative driving cycles for the city of Tehran are introduced. For data analyses, two different methods have been used. The former is that based on definition and selection of microtrips while the latter is based on data event selection not necessarily the microtrips. In both methods, the speed-acceleration specification is the major parameter of analyses. In addition, the application of Markov chain applied on the transition of microtrips and data points is also presented.

As the evaluation of vehicle fuel consumption and exhaust emissions is the object of driving cycle development process, it has then been shown that the parameters used in data analyses part of this study, are the main affecting parameters on vehicle fuel consumption and exhaust emissions. Furthermore, a comparison between fuel consumption and emissions of vehicle in different driving cycles and obtained driving cycles for Tehran is presented, using the simulation results.