Study of Simulation and Analysis of the SI Motorcycle Engine Electronic Ignition System

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ABSTRACT

The purpose of this research is to establish a computer simulation procedure to design and analyze the performance of four stroke SI motorcycle engine fuzzy controlled ignition system. Simulation of motorcycle engine output performance corresponding to the change of spark advance was evaluated by an engine simulation program. Spark advance angle was calculated by a fuzzy logic controller which was varied according to the throttle position and engine speed. This study compared different loading transient conditions engine performance such as indicated torque and power with the ignition spark advance controller parameters of the motorcycle engine. From the simulation result, the fuzzy logic controller provide reasonable better performance compared to the original ignition CDI map set data. This study established computer simulation software to simulate the dynamic response of real motorcycle engine electronic ignition system. The Real Time Workshop,(RTW) model was implemented with NI PIC-6024E data acquisition I/O board to send the simulated engine signals to ignition system module to control the spark in real time by the Hardware in the Loop,(HIL) platform from Matlab/SimulinkR. The electronic ignition control system is developed in the model-based environment, combined with embedded system to reach the performance targets for rapid prototyping controller. This approach gives a feasible evaluation tool for designing the motorcycle engine ignition controller system parameters and can provide the reference signals for the future ignition system controller parameter setup.

Keywords : Motorcycle Engine Spark Advance Control ; Fuzzy Logic Controller

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