Design and Development of Electronic Fuel Injection System for a Carburettor Based 150 cc Single Cylinder Engine

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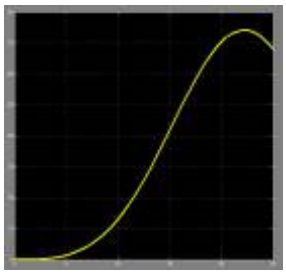
Abstract:

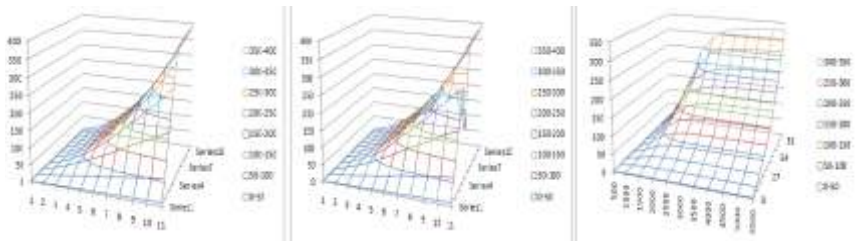
Electronic Fuel Injection System technology is one of the contributions of automotive electronics adopted in vehicles. The technology is taken as the subject of work, in which the mechanical linkages are replaced by more reliable and efficient electromechanical modules. The main reason for selecting this work is to increase the performance, make the system adaptive to the different climatic conditions and adaptive to different styles of riding.

In this project two main tasks are being addressed the first part deals with design and development of a model based Electronic Fuel Injection system using MATLAB/Simulink and generation of hypothetical log files for fuel injector. A functional block diagram for a model based design approach is developed. Individual sub systems are designed, developed and integrated with each other. Control logic is drafted and developed and integrated with the developed MATLAB/Simulink system plant. Second part of the thesis addresses the work involved in developing the electronic fuel injection system by mounting different sensors and actuators, target embedded processor and on to a bike. The log files generated in MATLAB/Simulink can be used for different targeted engines. A target engine is identified for the generated log files and then the map is generated for different test cases.

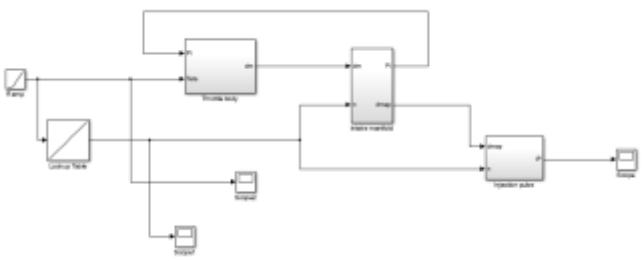
Test cases are designed for different drive cycles and the developed system is validated. The developed plant is tested for its intended operation by designing test cases and validating it after observing the test results. According to the results obtained the pulse width is starting from 0.5 ms to maximum of 602 ms. The future work is to integrate the developed EFI system with 150cc engine and to test the developed system functionality, performance. To incorporate any corrective measures required with respect to hardware.



Look -up curve



Hypothetical 3-D log files



Mathematical model for fuel injection