

A Study On The Performance Of Parallel Hybrid Vehicles

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ABSTRACT

Hybrid vehicle consists of two distinctive power sources which will power the vehicle itself. In the current market, Hybrid Electric Vehicle (HEV) is the most common type of hybrid vehicle throughout the world. Hybrid Electric Vehicle (HEV) consists of an internal combustion engine and an electric motor that can be configured into two designs which is series and parallel. In the research, parallel hybrid electrical vehicle is selected to become the focus of the research due to the system potential and versatility to be used in the roads of today. The parallel hybrid electrical vehicle sold today may consists the same configuration but different in the parameter setting of its main components. Thus, simulation software Learning Management System Imagine.Lab Advanced Modeling Environment Simulator is used to study the effects of the parameters which cover from engine capacity, battery output, idle speed, motor torque and the numbers of battery. By using the parallel hybrid vehicle configuration, parameters of the aspects will be modified and a comparative study with a controlled data is conducted. The control model results will be compared with the test results in terms of internal combustion engine output, electric motor output, battery state of charge and fuel consumption. Results show that by increasing the number of battery and battery output changes the hybridization factor of the vehicle. Thus, the system performs more like an electric vehicle where the motor increases output to about while the internal combustion output decreases. At the same time, fuel consumption improves by 3% to 5% depending on the nature of road the vehicle is driven in. Besides that, increasing the engine capacity causes both peak electric motor output to increase by 9% while peak internal combustion engine increases by 0.2%. However, it increases the vehicle fuel consumption by as much as 12% and drains more battery power than normal. In addition, increasing the motor torque and idle speed causes no major improvement on the performance of the vehicle. Finally, the findings are concluded and recommendations for future work are suggested.