

Development of a Drive Cycle Based Control Strategy for the KIIRA-EV SMACK Hybrid

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Abstract : New vehicle concepts targeting specific geographical markets are designed to satisfy a unique set of road and load requirements. The KIIRA-EV SMACK (KES) hybrid vehicle is designed in Uganda for the East African market. The engine and generator added to the KES electric power train serve both as the range extender and the power assist. In this paper, the design consideration taken to achieve the proper management of the on-board power from the batteries and engine-generator based on the specific drive cycle are presented. To harness the fuel- efficiency benefits of the power train, a specific control philosophy operating the engine and generator at the most efficient speed- torque and speed-power regions is presented. By using a suitable model developed in MATLAB using Simulink and Stateflow, preliminary results show that the steady-state response of the vehicle for a particular hypothetical drive cycle mimicking the expected drive conditions in the city and highway traffic is sufficient.

Keywords : control strategy, drive cycle, hybrid vehicle, simulation

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