

Control Strategy for Two-Mode Hybrid Electric Vehicle by Using Fuzzy Controller

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Abstract : Hybrid electric vehicles can reduce pollution and improve fuel economy. Power-split hybrid electric vehicles (HEVs) provide two power paths between the internal combustion engine (ICE) and energy storage system (ESS) through the gears of an electrically variable transmission (EVT). EVT allows ICE to operate independently from vehicle speed all the time. Therefore, the ICE can operate in the efficient region of its characteristic brake specific fuel consumption (BSFC) map. The two-mode powertrain can operate in input-split or compound-split EVT modes and in four different fixed gear configurations. Power-split architecture is advantageous because it combines conventional series and parallel power paths. This research focuses on input-split and compound-split modes in the two-mode power-split powertrain. Fuzzy Logic Control (FLC) for an internal combustion engine (ICE) and PI control for electric machines (EMs) are derived for the urban driving cycle simulation. These control algorithms reduce vehicle fuel consumption and improve ICE efficiency while maintaining the state of charge (SOC) of the energy storage system in an efficient range.

Keywords : hybrid electric vehicle, fuel economy, two-mode hybrid, fuzzy control

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