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Study on intelligent control system of EMA-CVT (Article)

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Abstract

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Continuously variable transmission (CVT) is more efficient in transmitting power from the engine to the wheels than traditional gearboxes as it able to provide an infinite number of gear ratios as per road conditions and car speeds. Current CVT system that utilizes hydraulic actuation mechanism experienced slow acceleration when move from standstill, less torque while climbing the hill and continuously produce unpleasant noise. One of the hydraulic system main problems is that when its fluid temperature is too high, its viscosity falls below the optimum value result in losses of the input power. Electromagnetic actuation (EMA) mechanism, an alternative to conventional mechanism, is discussed in this paper. The EMA is operated by controlling the supply current with a fuzzy logic controller (FLC). A simulation based FLC has been introduced here for identifying the desired current of the EMA actuate on based on UDDS and HWFET driving cycles. The FLC was successfully producing the required current to operate the EMA for the mention driving cycle. The paper also discussed on the development of laboratory scale new EMA as well as its simulation and experiment. The result showed that the EMA with 163 turns and 12.2A current able to generate electromagnetic force of 60N and hence validated the mathematical theory © BEIESP.

Author keywords

Electromagnetic CVT Electromagnetism Fuel efficiency Green house gas reduction Green transportation
Intelligent control system

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