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## Autonomous Electromagnetic Continuously Variable Transmission for Electric Vehicle (Conference Paper)

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### Abstract

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A continuously variable transmission (CVT) provides an infinite number of gear ratios depending on road conditions and vehicle speed, hence transferring power from the engine to the wheels more efficiently than traditional transmissions. The CVT is actuated by an electromagnetic actuator (EMA). The result of an EMA-CVT simulation based on a 16.67 kN passenger car showed that the EMA can develop electromagnetic forces in the range of 120 N to 210 N, equivalent to clamping forces, supplying current in the range of 6 to 9 A for maintaining the gear ratio of the vehicle transmission in the range from 1.1 to 5. Fuzzy Intelligent System (FIS) is used to make the CVT operate in stand-alone mode with EMA activation. FIS monitors the flow of power to the EMA based on the signal from the traction control sensor and the cruise control sensor. The results of experiments on the developed EMA prototype show that EMA develops an electromagnetic force in the range from 120 to 150 N, supplying current up to 10.50 A without a temperature spike of more than 40 °C. According to the results of the experiment, it was concluded that an autonomous electromagnetic CVT can save 20% energy, accumulating energy savings 75% from transmission system losses and 20% from weight reduction. © 2020 IEEE.

### SciVal Topic Prominence

Topic: Neural Network Control | Laguerre Polynomials | Lyapunov Theorem

Prominence percentile: 83.072

### Author keywords

CVT Electromagnetism Energy efficient Green transportation Intelligent system

### Indexed keywords

Engineering controlled terms:

Actuators Electric power transmission Energy conservation Intelligent systems Mobile telecommunication systems Powertrains Speed control Traction control Vehicle transmissions

Engineering uncontrolled terms

Continuously variable transmission Electromagnetic actuators Electromagnetic continuously variable transmission Electromagnetic forces Infinite numbers Stand-alone modes Transmission systems Weight reduction

Engineering main heading:

Variable speed transmissions

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