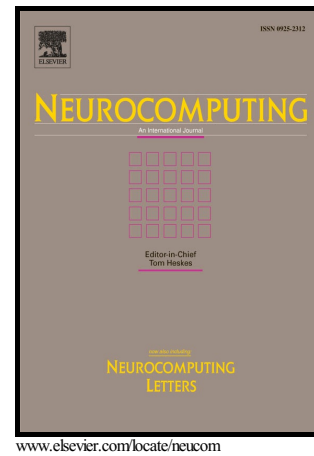


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# Fuzzy Controller Applied to Electric Vehicles with Continuously Variable Transmission

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## Abstract

This paper proposes an energy efficiency control strategy for electric vehicles (EV) equipped with continuously variable transmission (CVT). The strategy is based on a fuzzy controller that acts directly on the ratio of the CVT system, and uses the maximum efficiency motor rotation speed as a reference. Different to earlier proposals, this project involved the development of a more precise system that optimizes the maximum efficiency function of the PMDC motor for use as a reference for the controller. A full characterization of the system is provided, together with the results of simulation modeling employing different types of routes taken by the vehicle.

*Keywords:* Electric vehicle, CVT, fuzzy controller, energy efficiency.

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## 1. Introduction

A continuously variable transmission (CVT) system enables continuous adjustment of the transmission ratio of a vehicle in order to achieve the best relation between the required dynamics of the vehicle and the power of the motor. It permits choosing between either minimizing the work (maximizing the economy) or maximizing the dynamics. The main objective of CVT is to reliably transmit the power of the motor to the steering system by continuous adjustment of the transmission ratio, so that the motor operates with max-

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