

Design and Simulation of Regenerative Braking in BLDC Motor-Driven Electric Vehicles for Enhanced Energy Recovery

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Abstract: *The automotive sector has long relied on diesel and petrol as its primary fuel sources. However, electric vehicles (EVs) are poised to replace traditional internal combustion engines (ICEs) in the future. Although EVs are more energy-efficient than ICEs, their range is limited due to insufficient charging infrastructure. One solution to extend their range is regenerative braking, which allows the battery to recharge during deceleration [1][2]. This project demonstrates a simulation of BLDC motor control incorporating regenerative braking. Using MATLAB/Simulink, a detailed analysis was conducted to evaluate the BLDC motor's performance in both driving and power-generation modes during regenerative braking. The simulation results indicated an energy recovery efficiency of 0.35%[3]...*

Keywords: Electric vehicles, Regenerative braking, BLDC motor, Inverter, Battery

