

Analisis Performa Motor BLDC Terhadap Pengaruh Besar Arus dan Penambahan Superkapasitor Pada Simulator Sistem Propulsi Kendaraan Listrik = Analysis of BLDC Motor Performance on the Influence of Current Magnitude and Supercapacitor Addition in Electric Vehicle Propulsion System Simulator

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Abstrak

Kendaraan listrik merupakan solusi transportasi ramah lingkungan yang berpotensi mengurangi ketergantungan terhadap bahan bakar fosil. Meningkatnya popularitas kendaraan listrik sebagai alternatif transportasi berkelanjutan, memunculkan berbagai tantangan terkait pengoptimalan performa kendaraan tersebut. Untuk mengatasi tantangan-tantangan ini, diperlukan adanya pengoptimalan pada berbagai aspek seperti sistem penyimpanan energi, sistem pengisian, sistem penggerak, dan lainnya. Penelitian ini mengevaluasi kinerja motor BLDC sebagai sistem penggerak melalui pengujian dengan variasi arus dan beban motor. Pengujian bertujuan untuk mengamati pengaruh arus dan beban motor terhadap karakteristik waktu, tegangan, arus, suhu, torsi, dan rpm motor BLDC. Selain itu, penelitian ini juga meninjau dampak penambahan superkapasitor pada sistem propulsi. Hasil penelitian menunjukkan bahwa variasi arus dan beban motor secara signifikan memengaruhi karakteristik performa motor BLDC. Penambahan superkapasitor pada sistem propulsi terbukti meningkatkan stabilitas kinerja motor di setiap variasi pembebanan. Analisis data menunjukkan peningkatan torsi dan rpm yang lebih stabil, serta pengurangan suhu operasional, yang secara keseluruhan meningkatkan keandalan sistem penggerak kendaraan listrik.

.....Electric vehicles are an environmentally friendly transportation solution that has the potential to reduce dependence on fossil fuels. The growing popularity of electric vehicles as a sustainable transportation alternative presents various challenges related to optimizing vehicle performance. To address these challenges, optimization is required in various aspects such as energy storage systems, charging systems, drive systems, and others. This study evaluates the performance of a BLDC motor as a drive system through testing with variations in motor current and load. The testing aims to observe the effect of motor current and load on the characteristics of time, voltage, current, temperature, torque, and RPM of the BLDC motor. Additionally, this study examines the impact of adding a supercapacitor to the propulsion system.

The results of the study show that variations in motor current and load significantly affect the performance characteristics of the BLDC motor. The addition of a supercapacitor to the propulsion system has been proven to improve motor performance stability under various load conditions. Data analysis indicates an increase in torque and more stable RPM, as well as a reduction in operational temperature, which overall enhances the reliability of the electric vehicle's drive system.