

Sistem identifikasi karakteristik motor DC berbasis mikrokontroler = DC motor characteristic identification system based on microcontroller

Muhammad Aldo Setiawan, author

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Abstrak

Sistem identifikasi karakteristik motor DC berbasis mikrokontroler" merupakan sebuah instrumen untuk mengukur seluruh karakteristik dari motor DC (brushed). Dengan sistem yang embedded berbasis mikrokontroler yang terintegrasi, alat tersebut mampu mendapatkan seluruh karakteristik motor DC yang meliputi No load Current , Stall Current , Stall Torque ,Starting Voltage, Maximum Speed, Maximum Power, Maximum Efficiency, Motor Resistance, Motor Rating Voltage, Torque Constant, Back EMF Constant, Grafik kecepatan terhadap tegangan, Grafik torsi terhadap kecepatan, Grafik daya mekanik yang dihasilkan terhadap kecepatan, dan Grafik Respon Kecepatan Motor terhadap waktu. Untuk mendapatkan seluruh data karakteristik dari motor DC maka dilakukan pengambilan data dengan sensor gaya, sensor arus, dan rotary encoder, Dan disaat bersamaan memberikan variasi tegangan yang terukur pada motor DC yang diukur. Pengukuran pada saat kondisi kecepatan nol (stall) juga dilakukan untuk untuk mendapatkan seluruh karakteristik motor DC. Pengolahan, teknik pengambilan data, dan juga pemberian voltase pada motor DC diatur oleh mikrokontroler yang berisi algoritma teknik pengukuran dan perhitungan data yang didapatkan dari motor DC. Pembuktian kinerja alat dilakukan dengan cara melakukan pengukuran pada 3 sampel motor DC dan membandingkan dengan data referensi, sehingga disimpulkan bahwa alat mampu mendapatkan seluruh karakteristik motor DC dengan cara yang mudah dan simpel.

.....Dc Motor Characteristic Identification System Based on Microcontroller" is an instrument for measuring the characteristics of the DC motor (brushed). With a microcontroller-based embedded systems that are integrated, it is able to obtain all the characteristics of a DC motor which includes No load Current, Current Stall, Stall Torque, Starting Voltage, Maximum Speed, Maximum Power, Maximum Efficiency, Motor Resistance, Motor Rating Voltage, Constant Torque , Back EMF Constant, Speed vs Voltage Graph, Torque vs Speed graph, Power Output vs Speed Graph, Speed vs Time graph (Motor Respons). To get all the data characteristic of the DC motor data collection is performed using the force sensor, current sensor, and a rotary encoder, where at the same time give measurable voltage variations measured in a DC motor. Measurements at zero speed when condition (stall) are also performed to obtain all the characteristics of DC motor. Processing, data collection techniques, and also the provision of a regulated DC voltage to the motor, are controlled by a microcontroller that contains the algorithms of the measurement techniques and the calculation of data obtained from the DC motors, so that as one instrument that is able to identify the characteristics of the DC motor. Performance verification of the system is done by measuring the characteristic of 3 samples of DC Motor, and by comparing the results with reference data provided by vendor. So it can be concluded that the system that has been developed by the author is able to obtain all the characteristics of a DC motor with an easy and simple way.