

Parameters estimation and calibration of BLDC motor for Electric Powered Wheelchair

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Abstract. In order to analyse the numerical analysis, parameters are very important in the mathematical modelling work. This process will determine the correspondence output between mathematical modelling and real system. In this paper, estimation and calibration method of brushless DC (BLDC) motor parameters that used in Electric Powered Wheelchair (EPW) through experimental and simulation comparison are proposed. The setup of experiment consist of in-wheel BLDC motor with a driver, 36 volt battery, Arduino microcontroller, speed sensor and current measurement tool. Firstly, the initial parameters of motor are estimated by using related equation and fitting curve method. Then, initial estimated parameters are simulated in EPW modelling. Finally, parameters of the BLDC motor is calibrated according to the output speed of modelling and real DC motor using MATLAB-Parameter Estimation tool. Result shows the similarity between the modelling and real EPW output speed is 97.8% similar after calibration. In conclusion, the calibrated parameters are verified to use in modelling and for the further work in control designing of the EPW.