DELHI TECHNOLOGICAL UNIVERSITY
CERTIFICATE

This is to certify that the project report entitled "**PERFORMANCE EVALAUTION OF PERMANENT MAGNET BRUSHLESS DC MOTOR IN DIFFERENT MODES OF OPERATION**" being submitted by Archna Garg (01/C&I/2k10) in the partial fulfillment for the award of degree of Master of Technology in Control and Instrumentation (Electrical Engineering Department) of Delhi Technological University, Delhi is a record of bonafide work done by her under my guidance and supervision. It is also certified that this dissertation has not been submitted elsewhere for any other degree.

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ABSTRACT

The project work involves the performance evaluation of the Permanent Magnet Brushless DC Motor in different modes of operation. The Controlled electric motors play a vital role as the heart of the industrial automation. Therefore, the performance of the automated industry largely depends on the high performance motion control system. The performance is defined in terms of accuracy, smooth operation and also the simplicity of controlling scheme. In this work, the PMBLDC motor is operated in open loop mode and closed loop mode and the performance in both modes have been analyzed is observed and evaluated. Though, the open loop systems are simple in layout, less complex and thus economical too but closed loop systems are composed of a feedback mechanism, so they clear out the errors between input and output signals, and hence offer more accurate operation. In the present analysis the different schemes with the closed loop mode of operation are described, simulated in MATLAB/Simulink and their relative merits and limitation have been analyzed in detail. There is a further classification in terms of controlled parameters. Some schemes are modeled and simulated for only the speed control of the PMBLDC motor and some are modeled and simulated for the speed as well as current control. Then there is another classification of the mode based on the thing whether the use of mechanical sensors has been made or not. In some models, sensors are used while sensorless scheme has also been modeled and simulated. For the satisfactory performance of any drive, it is desirable during the operation at specified condition, the ratings are not exceeded. Also the smooth and efficient operation, fewer harmonic in current and minimum torque ripples are desirable. The simulated results are analyzed to evaluate the harmonic content of the drive current under various operating conditions and also the torque ripple under sudden application of load, sudden change in reference speed etc. The mathematical modeling of the power and control circuit for drive is described and MATLAB models have been simulation is done in MATLAB/Simulink version 7.9.0.529.