

Modeling and Simulation of Micro Step Drive for a Hybrid Stepper Motor*

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Abstract

The simplified dynamic mathematical model of hybrid stepper motor was studied in this research. The aim was to simplify the study and to concentrate on certain topic of this subject. The mathematical model which describes their mechanical and electrical dynamic behavior of the mentioned motor was done. Whereas, the mechanical model can be derived by Newton law, and electrical model can be derived by Kirchhoff law depending on the electrical equivalent circuit to each phase.

The resulting model was represented by distinctive equations, and appropriate drive algorithm in order to run this motor by using the computer program Matlab/Simulink. The hybrid stepping motor will be operated by micro-stepping.

The simulation results of the mentioned method helped in analyzing the micro-stepping driving manner, and how we can get the movement of the rotor angle position smoothly, and reducing the issue of electromechanical resonance and how to get high accuracy placement.

Key words: Hybrid Stepping Motor, Modeling Step Motor, Mathematical Model of Step Motor, Dynamic Characteristics, Micro-stepping Drive.

* For the paper in Arabic see pages (395-409)

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