

## Article Abstract

<b>Title:</b>	<b>Permanent magnet synchronous motor dynamic modeling with genetic algorithm performance improvement</b>
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<b>Abstract:</b>	This paper proposes dynamic modeling simulation for ac Surface Permanent Magnet Synchronous Motor (SPMSM) with the aid of MATLAB – Simulink environment. The proposed model would be used in many applications such as automotive, mechatronics, green energy applications, and machine drives. The modeling procedures are described and simulation results are presented. The validity of this dynamic model here is verified. Then, two genetic algorithm trials are presented to improve SPMSM performance. Maximum torque per ampere genetic algorithm function with maximum efficiency constrained is illustrated. Also, genetic algorithm maximum efficiency function constrained by GA maximum power factor is proposed. Simulations are implemented using MATLAB with its genetic algorithm toolbox. Finally, the required voltage to drive the motor at the desired improved characteristics is deduced for each case. All various characteristics are well depicted in the form of comparisons with such ones from original characteristics at rated voltage.
<b>Keywords:</b>	Permanent Magnet, Synchronous Motor, Simulink, Genetic Algorithm, optimization and MATLAB