

Modeling and simulation of DC motors in dynamic conditions allowing for the armature reaction

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Abstract:

Drives using DC motors are still extensively used in industrial plants all over the world. Nevertheless, the methods adopted to analyze the control system of such drives frequently involve several simplifications, chiefly in the modeling of the electrical machine. One of the main difficulties in modeling an electrical machine is related to the effects of the armature reaction, particularly under transient conditions. This paper presents a model suitable for transient studies of DC motors, including the overall effects of the armature reaction: saturation, commutation and interpoles action. The proposed model is used to simulate the motor operation in dynamic conditions and the results are compared with laboratory tests made on a real machine showing good agreement