



DTC based on Fuzzy Logic Control of a Double Star Synchronous Machine Drive

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Abstract: The paper discusses a direct torque control (DTC) strategy based on a fuzzy logic for double star synchronous machine (DSSM). The DSSM is built with two symmetrical 3-phase armature winding systems, electrically shifted by 30°. A suitable transformation matrix is used to develop a simple dynamic model in view of control. The analysis of the torque in the stator flux linkage reference frame shows that the concept of DTC can be applied in DSSM. A set of voltage vectors corresponding to the switching mode are chosen to offer a maximum voltage and keep the harmonics at a minimum. Further, a switching table specific for DSSM is proposed. Simulations results are given to show the effectiveness and the robustness of our approach.

Keywords: *Double star synchronous machine (DSSM); direct torque control (DTC); fuzzy control; robustness; resistance stator estimator.*

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