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Multiple Winding Multiphase Motor for Electric Drive System

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Abstract : This paper proposes a novel multiphase motor structure. The armature winding consists of several independent multiphase windings that have different rating rotate speed and power. Compared to conventional motor, the novel motor structure has more operation mode and fault tolerance mode, which makes it adapt to high-reliability requirement situation such as electric vehicle, aircraft and ship. Performance of novel motor structure varies with winding match. In order to find optimum control strategy, motor torque character, efficiency performance and fault tolerance ability under different operation mode are analyzed in this paper, and torque distribution strategy for efficiency optimization is proposed. Simulation analyze is taken and the result shows that proposed structure has the same efficiency on heavy load and higher efficiency on light load operation points, which expands high efficiency area of motor and cruise range of vehicle. The proposed structure can improve motor highest speed.

Keywords : multiphase motor, armature winding match, torque distribution strategy, efficiency
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