

永磁式涡流缓速器制动性能影响因素敏感性分析 Sensitivity Analysis on Influence Factors for Braking Performance of Permanent Magnet Type Eddy Current Retarder with Uniform Design

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关键词: 永磁式涡流缓速器 制动性能 均匀设计 敏感性分析 结构参数

摘要: 在分析永磁式涡流缓速器制动力矩与结构参数关系的基础上, 将均匀设计和回归分析方法引入到永磁式涡流缓速器制动性能影响因素敏感性分析中。以某型号的永磁式涡流缓速器为例, 建立了制动力矩随转子鼓内半径、永磁体周向长度、气隙宽度、转子鼓轴向宽度和永磁体高度5个结构参数变化的回归模型, 重点讨论了结构参数间交互作用以及各结构参数对制动力矩的影响程度, 基于均匀试验设计和制动性能敏感性分析的结果, 采用全排列法对结构参数进行了优化。 Based on the relationship between braking performance of permanent magnet type eddy current retarder and structure parameters, the method of uniform design and regression analysis were applied to sensitivity analysis on influence factors for braking performance of permanent magnet type eddy current retarder. The regressive models of braking torque were established concerning inside radius of rotor, circumferential length of permanent magnet, width of air-gap, axial width of rotor influenced and height of permanent magnet, the influences of structure parameters and it's interaction of permanent magnet type eddy current retarder on braking performance were studied systematically. Based on the result of uniform experimental design and sensitivity analysis, structure parameters were optimized by means of whole-arrangement method. The conclusion can be used in the option design, enhance braking torque and improved braking performance of permanent magnet type eddy current retarder.

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