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论文

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采用瞬时转矩控制策略的异步发电系统的容错研究

张兰红^{1,2}, 胡育文¹, 黄文新¹

1. 南京航空航天大学 航空电源航空科技重点实验室, 江苏 南京 210016; 2. 盐城工学院 电气工程系, 江苏 盐城 224003

Tolerant Research of the Induction Generation System Based on ITC Strategy

ZHANG Lan-hong^{1,2}, HU Yu-wen¹, Huang Wen-xin¹

1. Aero-Power Sci-Tech Center, Nanjing University of Aeronautics and Astronautics, Nanjing 210016, China; 2. Department of Electrical Engineering, Yancheng Institute of Technology, Yancheng 224003, China

摘要

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摘要 在六开关三相异步发电系统中增加较少的硬件,可实现对常见故障的容错,容错后系统重构为四开关三相运行系统。研究了容错型四开关三相系统中电压矢量的特点及其对磁链和转矩的调节作用,提出了四开关三相系统瞬时转矩控制中磁链和转矩的控制方案。对四开关三相异步发电系统的几个关键问题进行了研究,针对电容电压漂移问题,提出了修正转矩给定的有效方法。最后给出了仿真与实验结果。

关键词: 电力电子技术 航空电源 故障容错 异步发电机 瞬时转矩控制(ITC)

Abstract: In the six-switch three-phase induction generation system, a few usual fault modes can be tolerated by increasing some low cost hardware. The system is reconfigured as a four-switch three-phase generation system after the short-circuit or open-circuit fault of a power switch has been detected and isolated. Features of voltage space vectors of the tolerant four-switch system are analyzed. The adjust effect of different voltage vectors to flux linkage and torque is investigated. Control scheme of flux linkage and torque in instantaneous torque control(ITC) of four-switch three-phase system is proposed. Several key problems of four-switch three-phase system are researched. An effective method to restrain voltage excursion of two capacitors by modifying the torque command is presented. Simulation and experimental results are presented finally.

Keywords: power electronics technology aero power fault tolerance induction generator instantaneous torque control(ITC)

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