

电机电工

## 新型交替极无轴承永磁电机的原理与实现

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摘要

传统永磁型无轴承电机悬浮力和转矩控制存在耦合, 该文对一种新型交替极转子结构的无轴承永磁电机的磁悬浮原理进行了深入分析和数学建模, 指出该类型电机所具有的独特的悬浮控制和转矩控制解耦的特点, 并构建了无轴承交替极永磁电机的实时控制系统。实验结果表明实现了该新型无轴承永磁电机的动、静态稳定悬浮, 验证了悬浮与转矩控制解耦的特性。

关键词 [永磁电机](#) [无轴承电机](#) [交替极电机](#) [悬浮力](#) [磁悬浮](#)

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## The Principle and Implementation of a New-type Consequent-pole Bearingless Permanent Magnet Motor

Abstract

Due to the coupling effects of the drive torque and radial suspension force in conventional permanent-magnet-type bearingless motors, a profound theoretical analysis on mechanism of magnetic levitation for a new consequent-pole permanent magnet bearingless motor is presented and its mathematical model is also constructed in this paper. The unique decoupling effects without rotor angle on the control of torque and radial suspension force are especially discussed. Based on the detailed analysis of air-gap magnetic field, a real-time levitation force and torque control system is designed for a consequent-pole permanent magnet machine. The experimental results suggest good performance of static and dynamic suspension of this new-type bearingless motor and confirm the decoupling characteristics of suspension force and torque.

Key words [permanent magnet motors](#) [bearingless motor](#) [consequent-pole motor](#) [levitation force](#) [magnetic levitation](#)

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