航太用銅轉子三相感應馬達提升效率方法之研究

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摘 要

本文旨在利用等效電路建立分析銅轉子三相感應馬達之特性方程式，及探討鼠籠式轉子銅柱材料及尺寸對馬達性能之影響。銅轉子使用率雖尚未普及，但提升電動機效率已成為重要課題，銅轉子日後可能會因而漸漸取代傳統鋁轉子，對於銅轉子特性之研究亦成了重要的課題。感應馬達在業界中廣為使用，生活周遭更是隨處可見，將感應馬達效率提升一定可節省能源，達到環保的效益。 本文以一部200W/12pole的三相感應馬達為原型改變其轉子材料及改變定子繞線，並分析探討其轉矩特性之變化，以了解銅轉子對感應馬達轉矩特性的影響，並使用電腦軟體輔助模擬及計算感應馬達其他的特性如電流、功率、功率因數等，且著重於探討影響效率的因素，再由直流測試、堵住轉子測試、無負載測試及加負載測試等實驗驗證等效電路與模擬分析之結果，結果證明等效電路分析可了解影響效率表現之參數，並可利用軟體模擬參數改變對於效率值之影響，了解影響效率特性的參數以及馬達修改的部分提升效率的價值。

關鍵詞 : 三相感應馬達、鼠籠式銅轉子、三相感應馬達效率

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