

**Topic Area:** Electric Vehicle and Hybrid Electric Vehicle

**Paper No. :** PO-8 (612-M01-017)

**Title:** Design and Analysis of Interior Permanent Magnet Type Synchronous Motor

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**Date and Time:** November 2, 2004 Tuesday 10:40 - 12:10

**Venue:** Lobby B

## - Abstract -

Interior permanent magnet type synchronous motor (IPMSM) is widely used due to the characteristic that the reluctance torque contributes to total output torque with magnetic torque. It can make the motor have high power density, but also make the motor design and control difficult.

This paper deals with design and analysis of IPMSM used for driving compressor of air conditioner in automobile. For the application the IPMSM should have high speed limit with constant torque. Firstly, the torque-speed characteristics are calculated according to electric parameters such as current phase angle, back EMF, d-axis and q-axis inductances, etc. And then, the comparison and analysis of the calculated results show which parameters affect the output characteristics. At last, the results of an improved design to widen the operating speed limit considering the essential parameters are presented. The calculated and measured parameters are compared, and it shows good agreements.

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*Young-Jae Han, Ki-Hwan Kim, Sung-Il Seo, Young-Guk Kim, Seong-Ho Han, Sang-Su Kim, Jong-Young Kim (Korea Railroad Research Inst., Korea)*

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*Young-Jae Han, Seog-Won Kim, Sung-Il Seo, Chan-Kyoung Park, Su-Gil Lee, Jong-Young Kim (Korea Railroad Research Inst., Korea)*

**PO-8 (612-M01-017)**

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*Kyung-Hee Han, Soo-Hyun Baek (Dongguk Univ., Korea), Byung-Song Lee (Korea Railroad Research Inst., Korea)*

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*Ali Emadi, Sheldon S. Williamson (Illinois Inst. of Tech., USA)*

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*Hua Yang, Wen Xuhui (Chinese Academy of Sciences, China)*

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*Feng Zhao, Xuhui Wen, Ruzhen Dou, Zhijie Xu (Chinese Academy of Sciences, China)*

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*Hang-Sheng Chen, Mi-Ching Tsai, Nan-Chyuan Tsai (National Cheng Kung Univ., Taiwan)*