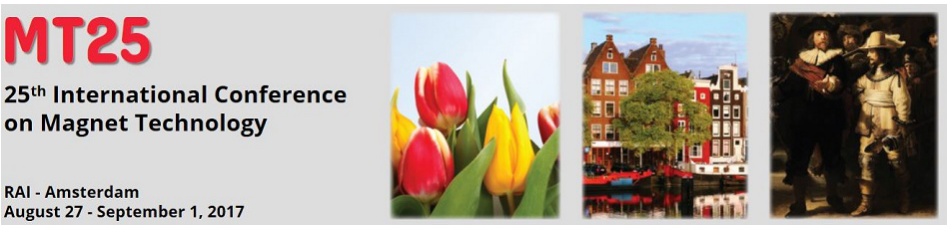

Contribution ID: **17** Type: **Poster Presentation of 1h45m**

Analytical Polynomial Models of Nonlinear Magnetic Flux Linkage for Switched Reluctance Motor

Monday 28 August 2017 13:15 (1h 45m)

In this paper, the flux linkage curve of the second form is analyzed. The characteristic of the flux linkage is presented in the form of a high order polynomial, which makes it easier for data-fitting. The flux linkage curve of the form ψ-θ curves for different i values is analyzed. The flux linkage data of the SRM prototype is obtained on 4 specific rotor positions (0°, 7.5°, 15°, 22.5°). The imitative effect of the flux linkage is not good enough especially when rotor positions are ranging from 0° to 7.5°. It is resulted from the following three reasons: Only 4 specific rotor positions are chosen to get the entire characteristic of the flux linkage. The highest degree of the data-fitting polynomial is three. The derivative of rotor positions ranging from 0° to 22.5° should be greater than 0 when using the least square method. It is easy to find that the error trend of different currents is same with rotor positions ranging from 0° to 7.5°. An error percentage correction coefficient can be introduced into the flux linkage curve for better accuracy when rotor positions changing from 0° to 22.5°. The flux linkage model can also be constructed through ψ(in, 0°) rapidly. ψ(in, 0°) is linear to the currents ik, so the equation for the fast flux linkage model can be obtained by draw into an coefficient matrix when the current is ik. The torque of the origin model, modified model, and fast model can be calculated by this method. Then make comparison with FEM calculated result to verifies the correctness of the modified model and fast model. The experimental verification is carried out based on the prototype. The results show that the simulation waveforms are consistent with the experimental waveforms, which verifies the accuracy of the model.

Submitters Country

China

Primary authors: CHEN, Hao (China University of Mining & Technology); Mr YAN, Wenju (China University of Mining and Technology); Mr CHEN, Lei (China University of Mining and Technology); Mr SUN, Meng (China University of Mining and Technology); Mr LIU, Zheng (China University of Mining and Technology)

Presenter: CHEN, Hao (China University of Mining & Technology)

Session Classification: Mon-Af-Po1.04

Track Classification: E1 - Motors