Contribution ID: **856** Contribution code: **THU-PO3-511-01** Type: **Poster**

An adaptive control strategy of electromagnetic bearing for flywheel energy storage based on online parameters identification

Thursday 18 November 2021 10:00 (20 minutes)

The bearings of the flywheel energy storage system play an important role in supporting the flywheel, reducing frictional resistance, and ensuring the stability of the whole system. It is a key component that determines the energy storage capability, charging and discharging efficiency, and lifetime of the flywheel. The electromagnetic bearing is a multi-variable time-varying coupling nonlinear system. In order to realize fast and accurate control of the electromagnetic bearing, an adaptive control method is proposed in this paper. The displacement stiffness and current stiffness of the electromagnetic bearing are online identified. The parameter identification results are used to optimize the control parameters of the electromagnetic bearing in real-time. In order to verify the efficacy of the proposed approaches, simulations and experiments were carried out. The experimental results show that the parameter identification method can effectively identify the current stiffness and displacement stiffness of the electromagnetic bearing. The adaptive control strategy has strong anti-interference performance and can operate stably under various operational conditions.

Primary authors: Mr YU, Suhang; GUO, Wenyong (Institute of Electrical Engineering, Chinese Academy of Science); Mr SANG, Wenju; Mr TENG, Yuping; Ms TIAN, Chenyu; Mr CAI, Yang; Mr XIAO, Liye

Presenter: GUO, Wenyong (Institute of Electrical Engineering, Chinese Academy of Science)

Session Classification: THU-PO3-511 Maglev and Levitation III