

Electromagnetic Effects between Rotating Permanent Magnet and Static Superconductors in Superconducting Flywheel Energy Storage System

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We investigated the electromagnetic effects between rotating permanent magnets (NdFb) and static superconductors to apply into the superconducting flywheel energy storage system (SFES) using the Maxwell program. A rotor was composed of the laminated permanent magnets and irons, and a stator consisted of bulk type superconductors. To simulate the electromagnetic effects in the SFES, we assumed that the bulk type superconductors have the only behaviors of diamagnetism. We designed the rotor to insert one or two irons into the center or trisection points of superconductors. The interval between the superconductor and the permanent magnet is 5mm. We confirmed that the rotor having two irons in the superconductors generated the more uniform magnetic flux than that having one iron in the superconductors. When the rotor having two irons in 10,000 or 20,000 [rpm], the magnetic flux in accordance with the increment of rotating speed was almost equally applied to the superconductors.

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