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Study on Counter-rotating Dual Rotors Radial Permanent Magnet Motor for underwater vehicle Propulsion

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A novel Permanent-magnet Machine with Counter-rotating Dual Rotors (PMCDR) is proposed in order to improve operation performance of underwater vehicle anti-rotation propulsion system. It can be substantially simplify system structure, decrease volume, reduce mass and cost, moreover, improve reliability without brush and slip-ring. The idea and principle of electromagnetic design are provided in order to meet power angle characteristic corresponding to uniform or similar between Inner Rotor Permanent-magnet Machine Unit (IRPMU) and Outer Rotor Permanent-magnet Machine Unit (ORPMU). Magnetic field, Stator yoke flux density , air gap flux density, inductance, no-load back-EMF and torque angle characteristic are obtained through the finite element method. A prototype has been designed, built, and tested. The method of detecting no-load back-EMF with search coils is proposed. The validity is verified by FEA results and experimental measurements.

Submitters Country

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