

عنوان مقاله:

Evaluation of Linear Permanent Magnet Vernier Machine Topologies for Wave Energy Converters

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خلاصه مقاله:

Today, the importance of using vernier machines in wave energy converters has increased because of its simple structure and ability to generate a lot of thrust force at low speeds due to the magnetic gear effect. The linear vernier permanent magnet machine has been designed in various structures. Proper design and selection of the main parameters of the machine will improve performance and increase the efficiency of the linear vernier machine. One of these parameters is the shape of the permanent magnets and how they are magnetically oriented. The novelty of this paper is the reduction of leakage flux, achieved by changing the shape and orientation of the permanent magnet. Three types of linear permanent magnet vernier machines with different permanent magnet structures and orientation, including V-shape, Halbach array and consequent-pole are presented. The considered machines have been compared to each other and to the existing machine in terms of airgap flux density, back EMF, PM flux, Inductance, thrust force, detent force, loss, efficiency, power factor, flux density and flux line, using the finite element method in the same conditions and with the same volume of permanent magnets. The results show that the magnetic orientation and shape of the permanent magnet have a considerable effect on the leakage flux, and all the proposed models have a lower leakage flux and better performance compared to the existing model.

کلمات کلیدی:

wave energy, Energy Converter, Permanent Magnet Shape, Vernier Machine, Halbach Array, Linear Machine, Finite element method

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