World Academy of Science, Engineering and Technology
International Journal of Transport and Vehicle Engineering
Vol:18, No:05, 2024

Temperature Rises Characteristics of Distinct Double-Sided Flat Permanent Magnet Linear Generator for Free Piston Engines for Hybrid Vehicles

Authors : Ismail Rahama Adam Hamid

Abstract : This paper presents the development of a thermal model for a flat, double-sided linear generator designed for use in free-piston engines. The study conducted in this paper examines the influence of temperature on the performance of the permeant magnet linear generator, an integral and pivotal component within the system. This research places particular emphasis on the Neodymium Iron Boron (NdFeB) permanent magnet, which serves as a source of magnetic field for the linear generator. In this study, an internal combustion engine that tends to produce heat is connected to a generator. Considering the temperatures rise from both the combustion process and the thermal contributions of current-carrying conductors and frictional forces. Utilizing Computational Fluid Dynamics (CFD) method, a thermal model of the (NdFeB) magnet within the linear generator is constructed and analyzed. Furthermore, the temperature field is examined to ensure that the linear generator operates under stable conditions without the risk of demagnetization.

Keywords : free piston engine, permanent magnet, linear generator, demagnetization, simulation
Conference Title : ICHEV 2024 : International Conference on Hybrid and Electric Vehicles
Conference Location : Belgrade, Serbia
Conference Dates : May 20-21, 2024