Design Method for Power Generation Systems for Diesel Vehicles Using a Permanent Magnet Synchronous Machine and a Full-Bridge Rectifier

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This paper describes a design optimization method for power generation systems for diesel vehicles consisting of a permanent magnet synchronous machine, a full-bridge rectifier and phase shift capacitors inserted between them. By combining an analysis method for the proposed systems and a multi-objective optimization method, a trial design optimization was carried out with the aim of minimizing indicators related to reducing the size and weight of the system. Furthermore, the performance of the optimized design was verified by numerical simulations, and it was confirmed that the required performance was achieved with the design while satisfying the constraints of the system.