

Special Issue Reprint

Advancements in Power Management Systems for Hybrid Electric Vessels

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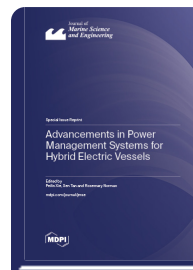
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As the maritime sector accelerates the transition toward hybrid and fully electric vessels, new challenges arise in the design and operation of shipboard power systems (SPSs). These advanced vessels integrate diverse energy sources such as fuel cells, photovoltaic systems, batteries, and supercapacitors, promising cleaner and more efficient operations. However, the complexity of managing SPSs, which function as localized microgrids without external grid support, demands innovative solutions to ensure high reliability, stable power quality, and optimal efficiency. This Special Issue brings together cutting-edge research that addresses these critical challenges. Topics include advanced control strategies, such as particle swarm optimization (PSO) and extended Kalman filter (EKF)-based control, innovative energy management systems (EMSs) using model predictive control (MPC), multi-time scale coordination, and layered control architectures. Additionally, predictive diagnostic techniques leveraging long short-term memory (LSTM) networks and clustering-based analytics are explored to enhance monitoring and maintenance. These contributions aim to advance the development of resilient, efficient, and sustainable SPSs, paving the way for a cleaner future in maritime transportation.

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