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Novelties in Marine Propulsion

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The maritime sector is undergoing a major transformation driven by stringent environmental regulations and IMO decarbonization targets. As shipping accounts for over 80% of global trade and a significant share of greenhouse gas emissions, the development of efficient and low-emission propulsion systems is a critical priority. This Special Issue, “Novelties in Marine Propulsion”, presents eight contributions that capture recent advances in CFD-based analysis, system-level propulsion design, and other emerging innovative concepts. These papers highlight the growing role of high-fidelity numerical methods in predicting complex hydrodynamic phenomena and enabling the efficient virtual prototyping of modern propulsion systems. A key theme of this collection is the shift from component optimization to integrated propulsion system design, where interactions between propulsors, hulls, and flow fields are explicitly considered. Alongside these developments, the authors also explore novel propulsion ideas inspired by fluid dynamics, as well as the integration of alternative energy systems such as hydrogen fuel cells. Finally, data-driven approaches and digital optimization strategies underline the increasing importance of operational intelligence in achieving real-world efficiency gains. Together, these contributions reflect a rapidly evolving field, where sustainability, advanced simulation, and innovative propulsion concepts converge to shape the future of marine transport.

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