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Editorial

Selected Papers from the Second International Conference on Modelling and Optimisation of Ship Energy Systems (MOSES2019)

Gerasimos Theotokatos [1,*] and Andrea Coraddu [2,*]

[1] Maritime Safety Research Centre, Department of Naval Architecture Ocean and Marine Engineering, University of Strathclyde, Glasgow G4 0LZ, UK
[2] Department of Naval Architecture Ocean and Marine Engineering, University of Strathclyde, Glasgow G4 0LZ, UK
* Correspondence: gerasimos.theotokatos@strath.ac.uk (G.T.); andrea.coraddu@strath.ac.uk (A.C.); Tel.: +44-141-548-3462 (G.T.); +44-141-548-4890 (A.C.)

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This Special Issue presents a collection of articles addressing the contemporary challenges in the areas of the ship energy systems modelling and optimisation. Four of them were initially presented in the 2nd International Conference on Modelling and Optimisation of Ship Energy Systems (MOSES2019). MOSES international conferences are organised biannually and were established to provide a forum for sharing and debating views, concepts and ideas in the area of ship energy systems including modelling, optimisation, control, maintenance, safety, autonomy/automation, environmental friendliness, sustainability. MOSES2019 was organised by the Maritime Safety Research Centre and the Department of Naval Architecture, Ocean and Marine Engineering of the University of Strathclyde in Glasgow, United Kingdom, in the period 8–10 May 2019. MOSES2019 was structured in 10 technical sessions including academic and industrial tracks, in which 35 technical papers were presented by experts from premiere maritime industry companies', high calibre academics and young researchers from world-leading institutions. The conference gathered 70 delegates, demonstrating its wide acceptance in the pertinent scientific community and its broad geographical reach.

This special issue includes six original articles; four submitted following the MOSES2019 conference and two additional contributions. These articles deal with concurrent topics on the following areas: Ship machinery optimisation, modelling and digital twins of dual fuel and gas engines, modelling of fuel as supply systems for liquefied natural gas (LNG) fuelled ships, power plants alternatives for wind farm support vessels, and regulatory instruments.

Baldasso et al. [1] developed an optimisation framework to facilitate the selection of the optimal engine room machinery configuration and employed it for the case studies of a bulk carrier and a cruise ship. This study concluded that the linear optimisation approach is appropriate for applications in the engine room design; however, the optimisation of the operating parameters require non-linear approaches. Stoumpos et al. [2] developed a digital twin integrating the thermodynamic and control functional modelling for a marine dual-fuel engine and presented the investigation of the engine operation in various transient conditions with operating mode changes. This study provided useful insights for the engine operational characteristics and the engine subsystems interactions under transient conditions and discussed the engine operational limitations. Xiang et al. [3] employed thermodynamic modelling to parametrically investigate and comparatively assess the knocking performance of a gas engine and a dual-fuel engine. This study quantified the effects of various engine

settings and presented their values for knock free engine operation. Choi and Park [4] investigated, by employing modelling, the operation of a fuel gas supply system by using carbon dioxide and glycol-water solution as the cooling medium. This study concluded that the use of carbon dioxide provides a number of advantages for the system operation compared to the use of a glycol-water solution. Eikeland Holmefjord et al. [5] assessed the performance of alternative power plants with alternative and direct current grids for wind farm support vessels. Based on full-scale measurements, this study evaluated the fuel savings that can be achieved for the case of the variable speed generator set operation and the direct current grid power plant concluding that the fuel savings amount up to 21% in comparison with the fixed speed generator set operation and the alternative current grid. Trivyza et al. [6] investigated the Energy Efficiency Design Index (EEDI) effectiveness for two typical ships, namely, a tanker and a cruise ship and a number of alternative propulsion plants, and compared the EEDI with the more realistic approach of employing the lifetime carbon dioxide emissions based on actual operating profiles. This study concluded that the EEDI is a conservative measure that can be used as an approximation of alternative power plants early in the design phase and provided various recommendations for policymakers as well as ship owners/operators.

Closing this editorial, the guest editors consider that this special issue will provide benefits to academic and industrial researchers for further developing the current and future research and innovation activities in the area of Ship Energy Systems.

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