Special Issue

Conceptual Design for Aeronautics Propulsion Applications

Message from the Guest Editors

Conceptual design plays a crucial role in developing aeronautics propulsion systems due to two main factors: the rising number of design variables and increasing pressure—industrial, economic, and geopolitical—to reduce development time for both new and modified concepts. In industry, it helps narrow the design space early on, enabling focus on promising technical solutions and reducing the cost and complexity of the detailed design phase.

The field has progressed beyond traditional gas path analysis to include surrogate models, artificial intelligence, hybrid approaches, and other methods. These aim to extract valuable insights from medium-/low-fidelity simulations that are computationally efficient and fast.

Various mathematical and computational strategies are being explored, but no single method has emerged as dominant. Instead, the optimal approach may depend on the specific design problem. This Special Issue presents and critically evaluates diverse methodologies—model-based, AI-driven, hybrid, and statistical—offering readers informed perspectives to guide conceptual design choices in increasingly complex environments.

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