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Special Session on

Thermal management of electric drives for demanding applications

Organized and co-chaired by:
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Call for Papers

Effective thermal management is one of the key enabling factors when designing electric drives with demanding high-specific output and reliable operation requirements. Uncertainties associated with predicting the thermal behaviour of electric drives frequently lead to cost ineffective solutions or reduced-life designs. Moreover, in an attempt to meet the ever-increasing demands on cost and packaging volume, the integration of electrical machines and power electronic converters in a single unit has become common in many applications, calling for a joint thermal assessment of the full drive rather than analysing the machine and converter separately.

This special session will examine a range of topics related to challenges specific to thermal management of electric drives, with particular focus on electrical machines, power converters and full-integrated drive units for highly demanding applications, some of which include propulsion and actuation in e.g. automotive or aerospace applications as well as power generation.

Topics of interest include, but are not limited to:

- Novel cooling concepts (liquid, evaporative, multiphase, etc.) for electrical machines and power electronic converters;
- Coupled heat transfer - combined solid and fluid domain modeling;
- Experimental validation of FE (finite element) and CFD (computational fluid dynamics) models for temperature and flow;
- Power loss characterisation in thermal analysis of electric drives;
- Heat transfer correlations and model reduction techniques for thermal models;
- Novel instrumentation techniques for thermal measurements, e.g. fiber-optic temperature sensors, heat flux gauge arrays etc.,
- Online temperature measurement and estimation in machines and converters – new approaches to thermal condition monitoring and diagnostics,
- The impact of thermal management on electric drives degradation and failure.

Submission of papers: deadline follows the deadline for the regular papers.
All the instructions for paper submission are included in the conference website:
http://www.icem.cc/2022