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Electric Machines and Power Converters Models for Digital Twins in Air Transportation Systems

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Abstract

To achieve the target of net zero emissions by 2050 imposed by the international regulations it is required a progressive electrification for all different transportation systems. For the aircraft industry this paradigm shift is not straightforward, mainly because of the complex validation procedures required for newly developed components. Therefore, advanced models and simulation tools for electric machines and power converters are required to model their dynamic as well as their energetic behavior in comprehensive systems simulations or digital twins of the whole aircraft architecture. The aim of this Special Session is to stimulate the scientific discussion and to share the experience on models and virtualization tools for electric machines and power electronics converters and their integration into comprehensive simulation tools of electrified air transportation systems.

This special session covers the following topics on modeling of electrical machines and power electronics converters for aircraft transportation:

- Modeling of electric machines and power electronics converters for digital twin models of aircrafts
- Multiphysics modeling of electrical machines and power converters for aircraft applications
- Dynamic models and numerical simulations of electric drives for the development of electrified aircrafts
- Electric power components modeling for more electric aircraft (MEA) and more electric propulsion engine (MEE) concepts
- Energetic and map-based electric machines and power converters modeling for the development of system simulations of electrified aircraft
- Modeling of electric components and electronic fault protection devices for aircraft power system
- Virtualization tools for electric components for aircraft systems validation.