Methodology of Geometry Simplification for Conjugate Heat Transfer of Electrical Rotating Machines Using Computational Fluid Dynamics

Authors : Sachin Aggarwal, Sarah Kassinger, Nicholas Hoffman

Abstract : Geometry simplification is a key step in performing conjugate heat transfer analysis using CFD. This paper proposes a standard methodology for the geometry simplification of rotating machines, such as electrical generators and electrical motors (both air and liquid-cooled). These machines are extensively deployed throughout the aerospace and automotive industries, where optimization of weight, volume, and performance is paramount -especially given the current global transition to renewable energy sources and vehicle hybridization and electrification. Conjugate heat transfer analysis is an essential step in optimizing their complex design. This methodology will help in reducing convergence issues due to poor mesh quality, thus decreasing computational cost and overall analysis time.

Keywords : CFD, electrical machines, Geometry simplification, heat transfer
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