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Validation of Numerical Approaches for Simulating the Heat Transfer in Stator Ducts with Measurements

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Abstract

In this paper, two different methods are presented for simulating the heat transfer along the stator ducts of a hydro generator. The investigations are focused on the fluid flow in an air gap between the insulation of the winding bars and the stator iron. Traditionally, the air gap is modeled with the finite volume method, so the heat conduction and the heat convection are taken into account. As a novelty, it is shown that it is also possible to define a thermal resistance in the interface simulating only the heat conduction without modeling the air gap resulting in faster simulations. Measurements are available for a validation of the two different numerical approaches.