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Local convective heat transfer identification by infrared thermography from a disk mounted on a cylinder in air crossflow

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Abstract

In this study, the local convective heat transfer from a disk was evaluated using an infrared thermographic experimental setup. Solving the inverse conduction heat transfer problem allows the local convective heat transfer coefficient to be indentified. We used an inverse method, based on spatial regularization, in order to take radial and angular conduction into account. This model was tested using crossflow Reynolds numbers between 11350 and 39600, corresponding to the turbulent flow domain. In this paper, the local convective heat transfer distribution on the disk allows us to study the boundary layer development with Reynolds number upstream the cylinder such as horseshoe vortex and their impact on heat transfer around and downstream the cylinder.

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