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ACCEPTED MANUSCRIPT

Heat source reconstruction from noisy temperature fields using a Gradient Anisotropic Diffusion filter

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Abstract

This paper presents a post-processing technique for noisy temperature maps based on a gradient anisotropic diffusion (GAD) filter in the context of heat source reconstruction. The aim is to reconstruct heat source maps from temperature maps measured using infrared (IR) thermography. Synthetic temperature fields corrupted by added noise are first considered. The GAD filter, which relies on a diffusion process, is optimized to retrieve as well as possible a heat source concentration in a two-dimensional plate. The influence of the dimensions and the intensity of the heat source concentration are discussed. The results obtained are also compared with two other types of filters: averaging filter and Gaussian derivative filter. The second part of this study presents an application for experimental temperature maps measured with an IR camera. The results demonstrate the relevancy of the GAD filter in extracting heat sources from noisy temperature fields.

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