



Contribution ID: 359

Type: Poster Presentation

Analysis of a Thermal Conductivity Measurement Technique Formulated as a Nonlinear Inverse Heat Conduction Problem

Tuesday, 8 July 2014 17:10 (1h 50m)

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Thermal analysis and solution of heat problems most often utilizes known thermal conductivity material data which is typically experimentally determined from heat flux measurements through the application of Fourier's law. The challenge posed by this approach is the need for known thermal conductivity reference materials which may be inhomogeneous and have large associated uncertainties in industrial physics applications. In this paper we investigate the feasibility of developing a thermal conductivity measurement system that utilizes known radiometric input sources and temperature output measurements by formulating the system as a nonlinear inverse heat conduction problem and solving utilizing recent techniques from geophysics and optimization.

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No

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Yes

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Session Classification: Poster1

Track Classification: Track F - Applied Physics