METTI5 Tutorial T11 on

“Inverse Heat Conduction Problem using thermocouples deconvolution and infrared measurements: application to heat flux estimation in a Tokamak”

Authors

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Duration

1h30

Type

Methodological/Numerical programming

Content

This tutorial is especially designed for beginners in inverse techniques in heat conduction. Internal components of magnetic confinement fusion machines are subject to significant heat fluxes. In order to estimate the input heat flux on these plasma-facing components, some temperature measurements techniques are used: IR scanner, embedded thermocouples. Through this experimental example we propose to detail a heat flux estimation procedure associating deconvolution and regularization methods (SVD, Tikhonov). This tutorial will be organized as follow:

- Presentation of the experimental context and of the measurements data
- Presentation of the inverse problem
- Description of the inversion procedure used and validity domain of the method
- Application to experimental data

All the source codes are written with Matlab. The source code will be given to the participants at the end of the tutorial.