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Calibration of the Johnson damage model using the elastic bayesian framework

Calibrating a simulation model involves estimating model's parameters by comparing its outputs with experiences to ensure that simulation results accurately reflect those experiences. However, when outputs are functions of time, there are multiple ways to define the difference between experimental and simulated outputs. It has recently been proposed to use elastic functional data analysis, which makes it possible to decompose a functional output into two new functions: a temporally aligned function and its corresponding warping function. This approach splits the problem into two independent calibration tasks to address functional misalignment. The first task is based on the comparison of the aligned functions and the second one is based on the comparison of the warping functions. In this work, we develop this framework with the use of Gaussian process regression, we apply it to the calibration of the Johnson damage model, which describes spallation in ductile materials, and we compare it to a Bayesian calibration method that does not use functional alignment.

Special/ Invited session

Classification

Both methodology and application

Keywords

Calibration, Gaussian processes, Functional outputs

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