Identifiant de la contribution : **217** Type : **non spécifié**

”DYN2#6 - Stochastic Digital Twin of a Composite Plate for Predicting Lamb Wave Propagation”

mercredi 12 juillet 2023 12:20 (20)

This work presents a framework for stochastic updating for verifying and validating a finite element (FE)-based model - the Digital-Twin - of a composite plate, considering temperature influence on Lamb wave propagation. It begins with a deterministic updating procedure to find optimal mechanical properties, followed by a stochastic updating procedure to obtain probability density functions for meaningful parameters. The stochastic updating procedure is divided into two steps: a sensitivity analysis using Sobol Indices and a Bayesian inference process using Markov-chain Monte Carlo (MCMC) simulations and the Metropolis-Hastings sampling algorithm. To reduce the computational time required for the MCMC process, the work proposes using a surrogate model based on artificial neural networks (ANNs). The ANN can be trained using parallelized Monte Carlo simulations, in contrast to the sequential nature of the MCMC process. This approach reduced the time required for updating rounds by 450 times in the studied case without compromising the accuracy of the resulting probability density functions for model parameters.

Presenter(s) : TELOLI RAFAEL

Classification par session : Survishino 7 / Dynamic Modelling 2