EngOpt2018 - 6th International Conference on Engineering Optimization
Instituto Superior Técnico, Lisbon Portugal • 17-19 September, 2018
Editors: H.C. Rodrigues, J. Herskovits, C.M. Mota Soares, et al.

Abstract ID 1074

UNCERTAINTY QUANTIFICATION AND MODEL IDENTIFICATION IN A BAYESIAN AND METAHEURISTIC FRAMEWORK

Alexandre Löw[(1)], Herbert Gomes[(2)]

[(1)]UFRGS, Brazil
alexandre.low@ufrgs.br

[(2)]Federal university of Rio Grande do Sul, Brazil
herbert@mecanica.ufrgs.br

Keywords: system identification,uncertainty quantification,model updating,modal analysis.

Abstract: Uncertainty quantification of identified parameters is an important feature when some quality assessment of the results of model updating procedure is necessary, or when important decisions depend upon these values. In this work, a modification of the conventional sensitivity method is tested along with a Bayesian Monte Carlo framework for identification of system parameters from experimental data, and their probability distributions. First, the updating procedure uses a metaheuristic algorithm (derivative-free) and the Euclidean norm metric. Then, a modification of Markov Chain Monte Carlo method called Transitional MCMC is applied to obtain an approximation of the mean values and probability distributions of the updated parameters based on the scattering of the experimental data. An example is presented with real structure experimental data for updating discrete mass, stiffness and damping parameters, as well as a comparison with previous results yielded by different methods, suggesting equivalent levels of agreement in the updated parameters, but with the advantage of MCMC formulation being practically independent of parameters vectors.