





Bayesian approaches for model identification: case studies and open issues

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General Information

Model updating procedures based on experimental data are commonly used in civil engineering field to identify numerical models that are subsequently employed to assess their structural behaviour. The reliability of these models is closely related to their ability to account for all the uncertainties that are involved in the knowledge process. In this regard, to handle these uncertainties and quantify their propagation, Bayesian inference is frequently employed being able to deal with the effects of parameter uncertainty, observation errors and model inadequacy. The computation of the posterior distribution through Bayesian inference needs – however - the evaluation of the likelihood function, which requires solving complex multi-dimensional integration problems.

To discuss this shortcoming, this seminar proposes the comparison between two Bayesian inference approaches to show how different approximations affect the results of simulated inference: a discrete approach for the likelihood computation in the Bayesian Model Updating (BMU) and a Monte Carlo likelihood-free method known as Approximate Bayesian Computation (ABC) are reported. As reference, some case studies are proposed by using the natural frequencies as experimental data for model updating.

The course will be held online in English with the schedule attached below.

Schedule	
Dates	Description
Date: 24/09/24	Introduction to the model identification procedures and Bayesian Inference
14:00-15:00	
Date: 01/10/24	Discussion on case studies and open issues
14:00-16:00	
	Total 3 Hours – 0.5 Credits

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International Doctorate in Civil and Environmental Engineering