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## **Advanced harmonic-hybrid reduced model for solving parametric dynamics in structural health monitoring**

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# Advanced harmonic-hybrid reduced model for solving parametric dynamics in structural health monitoring

**Submission Topic :** MS18 - System Identification and Damage Detection

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**Abstract Summary :** This work presents an innovative technique that helps to accelerate structural dynamics simulations when there is a defect in the structure and at the same time, allows its approximation in a parametric way by using reduced models. These developments open the door to the introduction of robust hybrid twins applied to structural health monitoring (SHM), where a physics-based numerical model is enriched with real measured data to correctly predict a real phenomenon, which in this case would be the dynamic response of a damaged structure. This hybrid twin is then used to train a neural network, which is able to predict the position of the damage and its severity on the structure. Several numerical examples are provided in this work, which illustrate the performance of the proposed methodology for the parameterization of dynamic simulations on a plate as well as for the identification of the location and severity of damage on it.

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