**Session Title**: Nonlinear vibrations and data-driven methods

**Introduction**:

Nonlinear vibration is a complex phenomenon that describes the vibration behaviours of a system, where the vibration characteristics of the system cannot be simply described by linear relationships. In physics and engineering, nonlinear vibration typically refers to situations where the restoring force, damping force, or other related parameters of a vibrating system do not have a linear relationship with the system's displacement, velocity, and other state variables. Such nonlinear relationships can lead to very complex vibration behaviours, including the emergence of multiple vibration modes, amplitude-dependent frequency changes, and possible chaotic behaviours, etc.

On the other hand, data-driven methods and models for predicting dynamic responses of nonlinear systems are of great importance due to their wide application from probabilistic analysis to inverse problems such as system identification, damage diagnosis and intelligent control.

Overall, nonlinear vibration is a complex and extensive research field, involving knowledge and methods from multiple disciplines, and it is of great significance for understanding and predicting the vibration behaviours. Therefore, the purpose of this session is to provide the communications on the applications and advantages of data-driven methods for nonlinear systems on modelling, analysis, vibration suppression, control strategy.

**Topics**:

* Nonlinear vibration phenomenon
* Nonlinear analytic methods
* Vibration isolation and absorption
* Nonlinear vibration control
* Nonlinear vibration energy harvesting
* Identification and inverse problems
* Nonlinear dynamic control

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