Title : Data-driven modeling of unsteady nonlinear systems

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Abstract :

ROMs are cheap approximations of full order models and are ideal for multi-query applications. There have been various strategies for inferring such models from data, but existing State-of-the-Art (SoA) mostly fall short when applied to complex dynamical systems, hindering their application in the context of control and optimisation. The main bottleneck, as mentioned above, can be attributed to the lack of predictability and generalisability of the existing reduction strategies.

In this talk, we aim to address some of these issues by exploring strategies for embedding uncertainty information in model predictions. Access to UQ not only provides an estimate of model robustness, but can also be used to perform adaptive sampling to ensure the generalisability and predictability of the model under varying operating conditions, thus taking a step towards controlling such complex systems.