



CSC Seminar

SPEAKER

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TITLE

Efficient and adaptive rational approximation for parametric dynamical systems

ABSTRACT

I describe an MOR approach for parametric frequency-response problems, where the high-fidelity problem is used to model not only the impact of the frequency on the system response, but also that of additional (e.g., design or uncertain) parameters. My proposed MOR method relies on minimal rational interpolation [1] for the surrogate modeling of the frequency dependence, for few fixed values of the parameters. The different frequency-surrogates are then combined to obtain a global approximation with respect to both frequency and parameters [2].

I also describe how, in the interest of making my approach more accurate and efficient, one can select the sample points adaptively, still within a non-intrusive framework. This is achieved by using locally adaptive sparse grids over parameter space. This approach, among other benefits, is also able to weaken the curse of dimension that is incurred if many parameters are present.

References:

- [1] D. Pradovera (2020). Interpolatory rational model order reduction of parametric problems lacking uniform inf-sup stability. SIAM J. Num. Anal., 58(4), 2265-2293.
- [2] F. Nobile, D. Pradovera (2021). Non-intrusive double-greedy parametric model reduction by interpolation of frequency-domain rational surrogates. ESAIM: M2AN, 55(5), 1895-1920.

Wednesday, November 9, 2023 at 2:00 pm
seminar room Prigogine