Reduced order models for parametric eigenvalue problems

Abstract:

We propose efficient numerical methods for the approximation of parametric eigenvalues problems. We aim at methods that are robust and efficient for multidimensional, possibly stochastic, problems. A crucial aspects concerns the regularity of the solutions in terms of

the parameters. Eigenvalue clusters and crossings make the problem challenging and hard to solve. We introduce a priori and a posteriori tools to track the eigensolutions that can be used to design an efficient greedy strategy for the numerical approximation. A data driven algorithm is also introduced that looks promising in our first numerical tests.

Brief Bio:  
Daniele Boffi is professor of applied mathematics at the King Abdullah University of Science and Technology (KAUST) in Saudi Arabia. Before joining KAUST he was professor of numerical analysis at the University of Pavia in Italy. His research is devoted to the numerical approximation of partial differential equations, with particular interest in the finite element method and in mixed finite elements. Some of his most active research areas concern the approximation of eigenvalue problems arising from partial differential equations and the numerical modeling of fluid-structure interaction problems. He is coauthor of one of the most. widely used book on mixed finite elements and he is author of a highly cited survey on the approximation of eigenvalue problems. During his academic career at the University of Pavia he has been involved in several administrative duties, including being member of the Academic Senate, Director of the PhD Higher Education School, and member of the Evaluation Committee.