# Kolloquium

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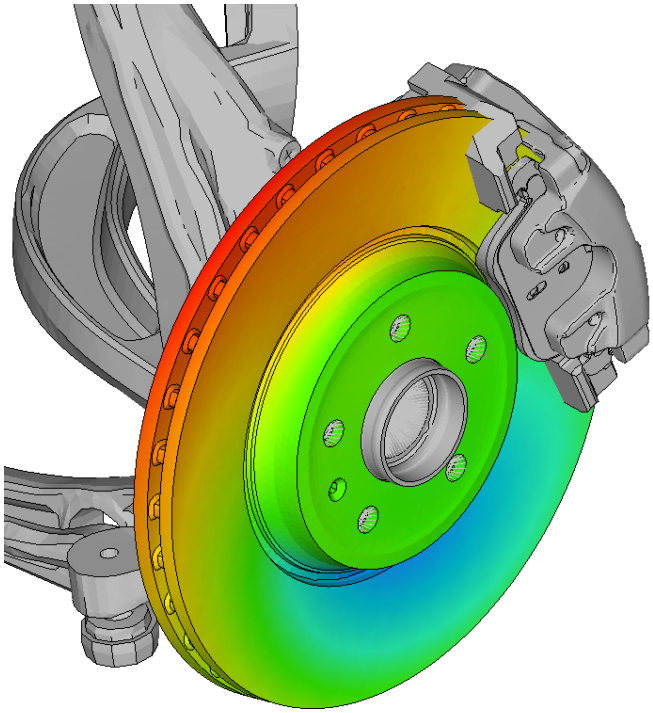
## *Adaptive Methods for the Numerical Solution of Eigenvalue Problems for Partial Differential Equations*

The numerical solution of eigenvalue problems for partial differential equations is an important and challenging problem in many applications areas, ranging from structural mechanics, electrodynamics, to fluid dynamics. The eigenfunctions are used, e.g., for reduced order modeling, stability and bifucation analysis, or the design of waveguide designs to name a few applications.

There are essentially two approaches, one is arising from engineering applications where typically very fine meshes are used and then numerical linear algebra methods have to deal with these very large discrete eigenvalue problems. The other approach from numerical methods is to start with coarse meshes and using error estimates to refine the mesh adatively towards the eigenfunctions. We will discuss both approaches and their advantages and disadvantages.



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