

C06: STRUCTURAL VIBRATIONS OF ELECTRIC MACHINES INDUCED BY MAGNETIC FORCES

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In the first part of C06 we aim at extending the AMIGA framework to incorporate the simulation of vibrations in the machine, especially ones induced by magnetic forces. For this, a 3D linear elasticity solver (based on geoPDEs/Isogeometric Analysis) is to be integrated into the framework, to allow for the computation of eigenmodes and eigenfrequencies. The next step will be to extend the magnetostatic simulation capabilities to 3D as well, so that magnetic forces can be computed. These will be coupled to the elasticity problem as periodic forcing to compute the frequency response. A model order reduction based on the eigenmodes is envisioned.

Current open questions include

- How can periodic boundary conditions be imposed on the elasticity problem?
- How do we treat air domains?
- Should subdomains be allowed to detach from one another? How to interpret if we instead treat them as one continuous domain?
- How to incorporate the pre-stressing of the component due to shrink-fitting?

The next step would be to incorporate adaptive refinement (in IGA).

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