Mortar FEs on Overlapping Meshes : Application to Magnetodynamics

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Abstract

The finite element (FE) method is frequently used in magnetodynamics as it is well suited to treat problems with complex geometries while keeping a simplicity in the implementation. In eddy current (EC) applications involving moving parts, better if the FE discretization technique can be applied on overlapping independent meshes. Indeed, the shape of the moving object as well as the way it moves, can be general. The mortar element method (MEM), a variational non-conforming non-overlapping domain decomposition approach [1], offers attractive advantages in terms of flexibility and accuracy. The original MEM has been generalised to deal with overlapping subdomains in [2] and [3]. A new interpretation of the overlapping variant of the MEM is proposed [4], in order to realize the bidirectional transfer of information between fixed and moving parts also in presence of jumps in the physical parameters between subdomains and action/reaction effects from the moving part. Numerical examples from the eddy current non destructive testing (EC-NDT) framework are presented to support the theory. This is a joint work with A. Christophe and Y. Le Bihan, both from the Laboratoire de Genie Electrique de Paris.

References

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