Some Advances in Finite Element Procedures

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ABSTRACT

We review in this presentation some recent advances in finite element methods, focusing on theoretically well-founded procedures for the solution of practical problems in engineering and the sciences. Important advances have been achieved recently in the analysis of shells, transient dynamics, and multi-physics problems in which the full coupling between solid, fluid, electromagnetic and thermal effects must be considered [1,2]. Also new insights into widely used techniques have been obtained [1-3]. The systems considered span from traditional structures to very small, like proteins and DNA structures. The finite element discretizations are based on elements that do not overlap and hence need the usual meshing, and finite elements that do overlap and hence need no mesh in the traditional sense [4]. Of course, polynomial element interpolation functions can be enriched for specific applications. In each case we mention the effective use of these procedures in engineering workflow environments and the expected impact of the novel analysis techniques on practical simulations.

REFERENCES

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