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Consistency and recovery in electroelasticity. II: Equilibrium and mixed finite elements. (English) Zbl 1096.74524

Comput. Methods Appl. Mech. Eng. 193, No. 23-26, 2155-2168 (2004).

Summary: The first part of this paper [ibid. 192, No. 7-8, 831-850 (2003; Zbl 1025.74030)] establishes the concept of consistency for standard finite elements in electroelasticity. This has permitted to trace the origin of certain spurious oscillations affecting the finite element response in terms of stress and electric flux density. In this second part, the consistency analysis is generalized to models which directly involve stress and electric flux density as independent variables. The analysis shows that also these models can suffer from spurious outcomes. However, selecting the approximation functions on consistency basis allows to eliminate, or at least reduce, the undesired oscillations.

MSC:

74S05 Finite element methods applied to problems in solid mechanics
74F15 Electromagnetic effects in solid mechanics

Keywords:

Electroelasticity; Equilibrium and mixed finite elements; Consistency; Recovery; Spurious oscillations

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