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**Some numerical aspects of mixed finite elements for bending plates.** (English) Zbl 0707.73074  
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Summary: Finite element schemes have been extensively studied during the ten last years. One of the reasons is the requirement of accuracy on stresses for composite materials. In this paper a numerical comparison between the solution of a mixed formulation and the famous QUAD 4 is carried out. We focus our attention on the stresses.

**MSC:**

- [74S05](#) Finite element methods applied to problems in solid mechanics
- [74P99](#) Optimization problems in solid mechanics
- [74K20](#) Plates
- [74S30](#) Other numerical methods in solid mechanics (MSC2010)
- [74P10](#) Optimization of other properties in solid mechanics

Cited in **6** Documents

**Keywords:**

thin plate; Kirchhoff-Love theory; QUAD4 element; mixed formulation; QUAD 4

**Full Text:** [DOI](#)

**References:**

- [1] Destuynder, Ph., Une théorie asymptotique des plaques minces en élasticité linéaire, () · [Zbl 0627.73064](#)
- [2] Hughes, T.J.R.; Taylor, R.L.; Kanoknukulchoi, W., A simple and efficient element for plate bending, *Internat. J. numer. methods engrg.*, 11, 10, 1529-1543, (1977) · [Zbl 0363.73067](#)
- [3] MacNeal, R.H., A simple quadrilateral shell element, *Comput. & structures*, 8, 175-183, (1978) · [Zbl 0369.73085](#)
- [4] Girault, V.; Raviart, P.A., Finite element methods for Navier-Stokes equations, () · [Zbl 0396.65070](#)
- [5] Hughes, T.J.R.; Tezduyar, T.E., Finite elements based upon Mindlin plate theory with particular reference to the four-mode bilinear isoparametric element, *ASME J. appl. mech.*, 46, 587-596, (1981) · [Zbl 0459.73069](#)
- [6] Belytschko, T.; Stolarski, M., Shear and membrane locking in curved  $C^0$  elements, *Comput. methods appl. mech. engrg.*, 41, 279-296, (1983) · [Zbl 0509.73072](#)
- [7] Destuynder, Ph.; Nevers, Th., Une modification du modèle de Mindlin pour LES plaques minces en flexion présentant un bord libre, (), 217-242, (2) · [Zbl 0646.73026](#)
- [8] Destuynder, Ph.; Nevers, Th., A new finite element scheme for bending plate, *Comput. methods appl. mech. engrg.*, 68, 127-139, (1988) · [Zbl 0626.73070](#)
- [9] Hughes, T.J.R.; Franca, L.P., A mixed finite element formulation for Reissner-Mindlin plate theory: uniform convergence of all higher-order spaces, *Comput. methods appl. mech. engrg.*, 67, 233-240, (1988) · [Zbl 0611.73077](#)
- [10] Belytschko, T.; Lasry, D., Transverse shear oscillations in four nodes quadrilateral plate elements, *Comput. & structures*, 27, 3, 393-398, (1987) · [Zbl 0624.73089](#)
- [11] Brezzi, F., On the existence, uniqueness and approximation of saddle point problems arising from Lagrange multipliers, *Rairo*, R2, 29-151, (1974) · [Zbl 0338.90047](#)
- [12] Bercovier, M., Perturbation of mixed variational problems. application to mixed finite element methods, *RAIRO, anal. numer.*, 12, 211-236, (1978) · [Zbl 0428.65059](#)
- [13] Bathe, K.J.; Brezzi, F., On the convergence of a four-node plate bending element based on Mindlin-Reissner plate theory and a mixed interpolation, () · [Zbl 0589.73068](#)
- [14] Brezzi, F.; Fortin, M., Numerical approximation of Mindlin-Reissner plates, *Math. comput.*, 47, 175, 151-158, (1986) · [Zbl 0596.73058](#)
- [15] Bathe, K.J.; Dvorkin, E., A formulation of general shell elements. the use of mixed interpolation of tensorial components, *Internat. J. numer. methods engrg.*, 22, 697-722, (1986) · [Zbl 0585.73123](#)
- [16] Nevers, Th.; Salaun, M., Vectorisation et parallélisation sur alliant FX8 d'un solveur pour LES schémas mixtes en théorie des plaques minces, Rapport interne du laboratoire de mécanique école centrale Paris, (1988)
- [17] Batoz, J.L., 20 ans avec l'élément finis DKT, ()

- [18] Akian, J.L.; Destuynder, Ph.; Nevers, Th.; Ousset, Y., Quelques méthodes d'éléments finis mixtes pour LES plaques minces, ()

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