Steigmann, David J.
Two-dimensional models for the combined bending and stretching of plates and shells based on three-dimensional linear elasticity. (English) Zbl 1213.74209

Summary: Models for plates and shells derived from three-dimensional linear elasticity, based on a thickness-wise expansion of the strain energy of a thin body, are described. These involve the small thickness explicitly and accommodate combined bending and stretching in a single framework. Physically motivated local constraints on the through-thickness variation of the displacement field, required for consistency with the exact theory, are introduced. When incorporated into the energy functional, these yield an expression for the two-dimensional strain energy density that includes non-standard two-dimensional strain gradient effects.

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74K20 Plates
74K25 Shells

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