



On minimum compliance problems of thin elastic plates of varying thickness

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The paper deals with two minimum compliance problems of variable thickness plates subject to an in-plane loading or to a transverse loading. The first of this problem (called also the variable thickness sheet problem) is reduced to the locking material problem in its stress-based setting, thus interrelating the stress-based formulation by Allaire (2002) with the kinematic formulation of Golay and Seppecher (Eur J Mech A Solids 20:631–644, 2001). The second problem concerning the Kirchhoff plates of varying thickness is reduced to a non-convex problem in which the integrand of the minimized functional is the square root of the norm of the density energy expressed in terms of the bending moments. This proves that the problem cannot be interpreted as a problem of equilibrium of a locking material. Both formulations discussed need the numerical treatment in which stresses (bending moments) are the main unknowns.