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Complex Potential Formalism for Flexure of Inhomogeneous Plates Including Transverse Shear Deformation

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The elegance of the Eshelby-Stroh sextic formalism in dealing with equations of plane strain elasticity motivated several investigators to extend its applicability towards the complex potential treatment of the classical laminate plate theory (CLPT) equations. CLPT is however adequate for accurate prediction of through thickness averaged displacements as well as force and moment resultants of very thin plates only. There is therefore much greater scope in using complex potential formalisms in connection with refined than CLPT equations. This paper is the first attempt towards the development of complex potential formalisms in association with refined plate theory equations. The development is based on the equations of a generalized plate theory that has been found adequate even for stress analysis studies of moderately thick laminated composites. Corresponding complex varible formalisms concerned with earlier but less accurate refined plate theories are also obtained as particular, though nontrivial cases of the present development.

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