Stress analysis for thick rectangular plates

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Abstract: The governing equations, previously developed for plate bending and inplane stretching [1], are solved for the average displacements, wج„ uج„ vج„ and average rotations $PHix ج¦y. This involved the solution of the governing equations for the inplane problem, which has not been accomplished in previous refined theories. Explicit expressions for inplane stresses د*f*x, د*f*y, and د„xy were found. The coupling of the bending problem and the inplane problem is manifested through the expressions derived from the inplane stresses. Also expressions for the resultant shear forces Qx, Qy; resultant couples Mx, My, Mxy; and resultant inplane forces Nx, Ny, and Nxy are found. III-conditioning problems that appear in a previous companion refined theory [2] were overcome in this present work. Results are compared with those as obtained from other refined theories.