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★**The biharmonic problem in the theory of elasticity. (English. English summary)**

Gordon and Breach Publishers, *Luxembourg*, 1995. *viii*+265 *pp.* $90.00. *ISBN* 2-88449-054-X

The objective of the book is to develop techniques for solving the biharmonic equation in the form of expansion in series of orthogonal and biorthogonal functions. The techniques are effective for problems posed on domains with simple geometry, for example, rectangles, circles, cylinders.

This book contains six chapters in 265 pages. The first chapter introduces the biharmonic problem in the plane, that is, the partial differential equation $\Delta\Delta\varphi = f(x, y)$, where $\Delta = \partial^2/\partial x^2 + \partial^2/\partial y^2$ is the Laplacian operator. Through several carefully selected examples the authors show that the familiar method of separation of variables and expansion in Fourier series fails in a rectangular domain for general boundary conditions. The second chapter introduces the idea of biorthogonal system of functions which remedies the shortcoming of the first chapter's attempt.

The remaining four chapters contain a large collection of problems derived from the linear theory of elasticity, where the methods developed in Chapter 2 can be applied effectively to obtain series solutions in biorthogonal functions. The titles of the chapters describe their contents: 3. Plane problem of theory of elasticity in Cartesian coordinates; 4. Plane problem of theory of elasticity in polar coordinates; 5. Biharmonic problem of the classical plate theory; 6. Axisymmetric problem of the theory of elasticity for the cylinder.

The bulk of the book should be readable by a wide audience since it requires not much more than familiarity with the technique of separation of variables. At some points excursions are made into the domain of contour integrals in the complex plane and pseudo-differential operators, but these sections can be omitted in the first reading without loss of continuity.

The book is a useful addition to the literature on differential equations and elasticity. Applied mathematicians and theoretically oriented engineers will find the book instructive and informative.

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