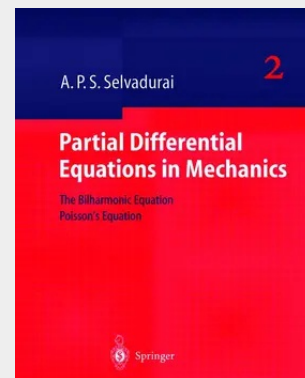


Partial Differential Equations in Mechanics 2

The Biharmonic Equation, Poisson's Equation

"For he who knows not mathematics cannot know any other sciences; what is more, he cannot discover his own ignorance or find its proper remedies. " [Opus Majus] Roger Bacon (1214-1294) The material presented in these monographs is the outcome of the author's long-standing interest in the analytical modelling of problems in mechanics by appeal to the theory of partial differential equations. The impetus for writing these volumes was the opportunity to teach the subject matter to both undergraduate and graduate students in engineering at several universities. The approach is distinctly different to that which would adopted should such a course be given to students in pure mathematics; in this sense, the teaching of partial differential equations within an engineering curriculum should be viewed in the broader perspective of "The Modelling of Problems in Engineering". An engineering student should be given the opportunity to appreciate how the various combination of balance laws, conservation equations, kinematic constraints, constitutive responses, thermodynamic restrictions, etc., culminates in the development of a partial differential equation, or sets of partial differential equations, with potential for applications to engineering problems. This ability to distill all the diverse information about a physical or mechanical process into partial differential equations is a particular attraction of the subject area.

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