Preface to the Third Edition

The first edition of this book was published in 1974, nearly twenty years ago. It was written as a text book for an introductory course in continuum mechanics and aimed specifically at the junior and senior level of undergraduate engineering curricula which choose to introduce to the students at the undergraduate level the general approach to the subject matter of continuum mechanics. We are pleased that many instructors of continuum mechanics have found this little book serves that purpose well. However, we have also understood that many instructors have used this book as one of the texts for a beginning graduate course in continuum mechanics. It is this latter knowledge that has motivated us to write this new edition. In this present edition, we have included materials which we feel are suitable for a beginning graduate course in continuum mechanics. The following are examples of the additions:

1. Anisotropic elastic solid which includes the concept of material symmetry and the constitutive equations for monoclinic, orthotropic, transversely isotropic and isotropic materials.

2. Finite deformation theory which includes derivations of the various finite deformation tensors, the Piola-Kirchhoff stress tensors, the constitutive equations for an incompressible nonlinear elastic solid together with some boundary value problems.

3. Some solutions of classical elasticity problems such as thick-walled pressure vessels (cylinders and spheres), stress concentrations and bending of curved bars.

4. Objective tensors and objective time derivatives of tensors including corotational derivative and convected derivatives.

5. Differential type, rate type and integral type linear and nonlinear constitutive equations for viscoelastic fluids and some solutions for the simple fluid in viscometric flows.

6. Equations in cylindrical and spherical coordinates are provided including the use of different coordinates for the deformed and the undeformed states.

We wish to state that notwithstanding the additions, the present edition is still intended to be "introductory" in nature, so that the coverage is not extensive. We hope that this new edition can serve a dual purpose: for an introductory course at the undergraduate level by omitting some of the "intermediate level" material in the book and for a beginning graduate course in continuum mechanics at the graduate level.

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