The chapter on thermophysical properties, curtailed from that in the first edition, should be different by giving uniformly the *latest* internationally-agreed property data and by giving information for modern materials: e.g., Table 65, reproduced from the 1950's, includes in its "selected nonmetals" none of the polymers in widespread use in the 1980's. One may perhaps allow use of outdated material properties in an elementary text where they will be used only in exercises: but in a handbook I would hope to find the currently most accurate values. The page of references on Fickian interdiffusion coefficients could have been saved by citing T. R. Marrero and E. A. Mason, *J. Phys. Chem. Ref. Data*, Vol. 1, 1972, pp. 3–118, which reviews them.

Into whose hands would I place this Handbook? Certainly students and colleagues who might want a direct introduction to specific topics; also research engineers, consultants and other technically adept engineers. For some problems it is enough; for others, it helps provide an entry to the literature, especially from the 1955–1980 era.

Continuum Theory of the Mechanics of Fibre-Reinforced Composites. Edited by A. J. M. Spencer. Springer-Verlag, New York, 1984. 284 pages.

REVIEWED BY Z. HASHIN[1]

This book contains lectures given by A. H. England, D. F. Parker, A. C. Pipkin, T. G. Rolgers and A. J. M. Spencer on various aspects of the title subject matter at the International Centre for Mechanical Sciences (CISM) in Udine, Italy in 1981. The subject may be appropriately defined as mechanics of idealized strongly anisotropic materials. A basic assumed characteristic of such materials is inextensibility, i.e., zero strain, in one or more directions (fiber directions) (although Pipkin considers a case where the tensile strain but not the compressive strain vanishes). Another often assumed characteristic is incompressibility.

The first two chapters by Spencer, and Rogers are concerned with inextensible and incompressible materials. Spencer discusses constitutive relations for elasticity and plasticity and Rogers is concerned with finite deformations and the intrinsic stress singularities and discontinuities which arise in these kinds of idealized materials. The third chapter by England is concerned with plane problems for inextensible and incompressible linearly elastic strongly anisotropic solids. Pipkin in the fourth chapter discusses stress channelling and boundary layers in plane linear elastic deformation on the basis of inextensibility but not incompressibility, demonstrating that the stress singularities and discontinuities encountered in the idealized material are limiting cases of high stress gradients in strongly anisotropic materials. The fifth chapter by Rogers is concerned with mechanics of helically wound fiber reinforced cylinders when the material is inextensible in fiber directions and incompressible. This is a subject of engineering significance and it appears that the incompressibility assumption may introduce significant inaccuracies for the elastic behavior of actual fiber composites while the inextensibility assumption would be acceptable only for high modulus graphite/epoxy composites. In Chapter 6 Pipkin discusses fracture mechanics for inextensible materials. I believe this to be of particular interest in view of the relative simplicity of the theory in comparison with usual fracture mechanics of anisotropic materials. The test of the theory is of course experimental verification for high modulus fiber composites.

In Chapter 7 Spencer discusses reinforcement of holes in plates by fiber reinforced disks and Chapter 8, written by Parker, is concerned with wave propagation in inextensible and incompressible materials. Spencer in chapter 9 discusses dynamics of rigid-plastic beams and plates. He presents a number of simple solutions to important problems and it would seen that the simplified theory for idealized materials should be of particular value for this subject matter. Finally Pipkin in Chapter 10 generalizes Rivlin's theory of inextensible networks to the case when the fibers are inextensible in tension but not in compression thus taking into account in simple and elegant fashion the microbuckling of stiff fibers within a soft matrix.

The editor and the authors are to be commended for having succeeded in joining the various chapters organically together and they have thus been able to present a coherent and logical account of this interesting and important area of the mechanics of solids.

Finally, a semantic comment: The subject presented is mechanics of idealized strongly anisotropic materials and its description as mechanics of fiber reinforced materials is not always appropriate. The assumption of inextensibility would be quite inaccurate for glass/epoxy and metal matrix fiber composites and should probably be restricted to high modulus graphite/epoxy and fiber reinforced rubber. The assumption of incompressibility would not be adequate for linear elastic behavior and is much more appropriate for plastic strains and for fiber reinforced rubber.

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