BOOK REVIEWS

Tensor analysis. Theory and applications. By I. S. Sokolnikoff. New York, Wiley, 1951. 10+335 pp. $6.00.

This volume is an outgrowth of a course of lectures given by the author over a period of years at the University of Wisconsin, Brown University, and the University of California. It consists of a general introduction to vector analysis and tensor calculus with special emphasis on the various applications. A short bibliography of some of the texts of the subject is given on p. 327 and an index is on pp. 329–335.

The book consists of six chapters. The first two deal with linear vector spaces, matrices, and the calculus of tensors. The last four chapters consist of applications to geometry, analytical mechanics, relativistic mechanics, and mechanics of continuous media. Throughout the book there are exercises to illustrate the already established concepts and formulas.

In the first chapter, the student is introduced to the concept of vector by intuitive and geometrical means. Thereafter, linear vector spaces over the fields of real and complex numbers, Euclidean spaces of n dimensions, linear transformations and matrices, reductions of quadratic forms, orthogonal and Hermitean matrices are discussed. In the second chapter, the usual concepts of the tensor calculus are introduced with a short section on relative tensors. After a short treatment of the Riemannian metric tensor and the Christoffel symbols, covariant differentiation is defined by writing the well known formulas. By means of Ricci's commutation rule for the covariant differentiation of tensors, the Riemann-Christoffel tensor is obtained. After treating the Ricci tensor and the Riemannian (including the Euclidean) spaces, this second chapter closes with a discussion of the generalized epsilons and Kronecker deltas together with applications to determinants.

The third chapter, on geometry, begins with a short exposition of the development of non-Euclidean geometries. The author defines the metric of a general Finsler space of which Riemannian geometry is a special case. The remainder of the chapter is devoted to the study of classical differential geometry of curves and surfaces in Euclidean three-dimensional space, as is done in such books as *An introduction to differential geometry*, by L. P. Eisenhart, Princeton University Press, and *Applications of the absolute differential calculus*, by A. J.