very far the author succeeds in convincing the reader of the advantage resulting from attacking a problem in mechanics by appropriate mathematical tools.

Matrix theory occupies about one third of the book. A brief account of matrix algebra (including the Cayley-Hamilton theorem) is followed by a discussion of power series in matrices and of the calculus of matrix-valued functions. Applications are given to the theory of small oscillations around a point of stable equilibrium, to the theory of aircraft flutter and to elastic deformation theory.

Tensor calculus is developed primarily for the Euclidean three-space. The discussion centers around curvilinear coordinates, the metric tensor and covariant differentiation. As a first application the fundamental equations of mathematical physics are written in general curvilinear coordinates. A brief chapter on fluid dynamics is followed by a comparatively extensive treatment of tensor methods in the theory of elasticity. A distinctive feature of these chapters is the author's determination not to limit himself to infinitesimal deformations. The last two chapters are devoted to tensor calculus in Riemannian spaces with applications to classical mechanics and boundary layer theory.

The volume is based on a series of lectures given to a group of research engineers. It could be well used in a graduate or senior undergraduate course for engineering students. The exercises are not numerous but are selected skillfully. A few awkward expressions and slips of the pen (for instance on p. 32, l. 27, p. 34, l. 11, p. 41, l. 10, p. 88, l. 20) do not detract materially from the value of this enthusiastically written and useful book.

LIPMAN BERS

Theory and application of Mathieu functions. By N. W. McLachlan. New York, Oxford University Press, 1947. 9+401 pp. $12.50.

Part I of this book contains a comprehensive treatment of analytical and numerical methods which have been successfully used to obtain solutions of the various forms of Mathieu's differential equation, satisfying various conditions, and for complex as well as real values of the independent variable. It discusses also the theoretical background underlying these methods. A large part, estimated by the author as one third, of this material is new, filling gaps by extending over the whole field methods which had proved useful in part of it; the book will therefore be very useful to a reader who wants to make a new application without having to extend the theory.

The subjects covered include the integral equations and relations satisfied by the solutions; the distribution of their zeros; the periodic