Buchbesprechungen

Studies in Non-Linear Stability Theory. By W. ECKHAUS. With 12 fig., VIII, 117 p. (Springer Tracts in Natural Philosophy: Vol. 6.) Berlin-Heidelberg-New York: Springer-Verlag. 1965. Cloth DM 22,—.

This book represents a comprehensive presentation of the author's series of papers which originally appeared in the "Journal de Mécanique" during 1962—63. In this book his theories have been developed more coherently and in greater detail. All the research presented is the author's and the references to other existing literature is limited to papers directly related to the subjects under discussion. The presentation is clear and carefully carried through however the complexity of the methods and the amount of detail necessary for them make slow and careful reading necessary.

ECKHAUS' method is based on two mathematical concepts. Series expansions in terms of eigenfunctions and asymptotic expansion with respect to suitably defined small parameters. Using these concepts he studies a series of one and two dimensional problems. Solutions are formulated and analysis of their behavior are discussed. Suitable justification and careful analysis have been given to the asymptotic approximations and considerable use is made of new eigenfunction expansion techniques. Problems discussed in the book include BURGER's model of turbulence and modifications of it and solutions in Poiseuille and Couette flows.

With this book ECKHAUS has made a very welcome addition to the literature of the ever increasingly important field of non-linear techniques. He has clearly shown the vast complexity of it and the need for careful analysis. One is left with the thought that here is a technical field greatly in need of more powerful mathematical techniques than are now currently available for it.

An extensive bibliography of research papers and books on non-linear stability problems has been included.

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