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Die Grundlehren der mathematischen Wissenschaften

in Einzeldarstellungen mit besonderer Berücksichtigung der Anwendungsgebiete

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Multiple Integrals in the Calculus of Variations

By **Charles B. Morrey, Jr.**
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XII, 506 pages. 8vo. 1966
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The theme underlying this book is the theory of the existence and differentiability of the solutions of problems in the calculus of variations involving multiple integrals. In treating this subject it became necessary to discuss related topics such as the theory of elliptic systems of partial differential equations and the theory of the so-called SOBOLEV spaces. A feature which has been until very recently peculiar to the subject of this book is the necessity of studying linear elliptic systems in which the coefficients may be discontinuous; the book contains an exposition of the famous DE GIORGI-NASH-MOSER results as well as the author's previous results concerning such equations. Proving the results concerning the higher differentiability requires the study of standard linear elliptic systems of the second order. Since the methods of handling such systems are entirely similar to those for handling linear systems of higher order, a chapter is devoted to such systems. The analyticity of the solutions requires a proof of the analyticity of general non-linear elliptic systems with general boundary values. The last two chapters of the book are concerned mainly with the classical work on the plateau problem in two dimensions and the work of REIFENBERG on the higher dimensional Plateau problem. The variational method is applied to harmonic integrals on real and complex manifolds.

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