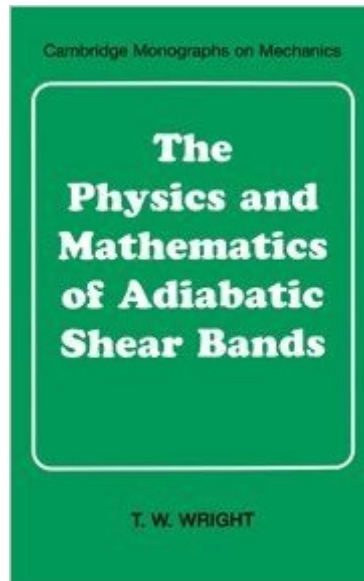


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Synopsis

This monograph covers the material instability known as adiabatic shear banding which often occurs in a plastically deforming material as it undergoes rapid shearing. This book surveys these exciting developments at the frontier of mathematics and presents many new results. materials with continued straining, a process which is usually unstable. In this case the instability results in thin regions of highly deformed material, which are often the sites of further damage and complete failure. Divided into three parts, the book first reviews the physical phenomena and the standard methods of testing and characterization. It then establishes a general theory of isotropic plasticity with finite deformations as a setting for the simpler, but still nonlinear and highly coupled, equations of adiabatic shearing and the idealizations that are necessary to establish them. The main body of the book examines a series of one-dimensional problems of increasing complexity.

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