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### Mathematical Models in Contact Mechanics

Mircea Sofonea and Andaluzia Matei

This text provides a complete introduction to the theory of variational inequalities with emphasis on contact mechanics. It covers existence, uniqueness, and convergence results for variational inequalities, including the modeling and variational analysis of specific frictional contact problems with elastic, viscoelastic, and viscoplastic materials. New models of contact are presented, including contact of piezoelectric materials. Particular attention is paid to the study of history-dependent quasivariational inequalities and to their applications in the study of contact problems with unilateral constraints. The book fully illustrates the cross-fertilization between modeling and applications on the one hand, and nonlinear mathematical analysis on the other. Indeed, the reader will gain an understanding of how new and nonstandard models in contact mechanics lead to new types of variational inequalities and, conversely, how abstract results concerning variational inequalities can be applied to prove the unique solvability of the corresponding contact problems.

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