NEW TRENDS AND DEVELOPMENTS IN VARIATIONAL ANALYSIS

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Variational analysis has been well recognized as a rapidly growing and fruitful area in mathematics motivated mainly by the study of constrained optimization and equilibrium problems, while also applying perturbation ideas and variational principles to a broad class of problems and situations that may be not of a variational nature. One of the most characteristic features of modern variational analysis is the intrinsic presence of nonsmoothness, which naturally enters not only through the initial data of the problems under consideration but largely via variational principles and perturbation techniques applied to a variety of problems with even smooth data. Nonlinear systems and variational systems in applied sciences also give rise to nonsmooth structures and motive the development of new forms of analysis that rely on generalized differentiation.

In this talk we discuss some new trends and developments in variational analysis and its numerous applications in both finite-dimensional and infinite-dimensional spaces, emphasizing those to optimization and equilibrium problems, robust stability and error bounds, and optimal control. It is partly based on the author's recent 2-volume book "Variational Analysis and Generalized Differentiation, I: Basic Theory, II: Applications," Springer—Grundlehren (Fundamental Principles of Mathematical Sciences) and contains also brand new results.