Modern Mechanics and Mathematics

Mechanics and mathematics have been two complementary partners since the time of the founding masters, Newton, Euler and Lagrange and great names such as Legendre, Poisson, Jacobi, Hamilton, Gauss, Cauchy, Fourier, Poincaré, Liapunov and Einstein. In the history of science, developments in mathematics and mechanics have always been intertwined; on the one hand, analysis of mechanical phenomena depends on the powerful tools of mathematics; on the other hand, revolutionary mathematical methods and concepts were often developed by mechanicians in order to meet their own needs. These methods and concepts often stimulated new developments in mathematics. For example, in the modern mathematical theory of convex analysis, the fundamental concepts of sub-differential and super-potentials were originally introduced by J.J. Moreau in the study of friction. Today, the theory of convex analysis, with its diverse applications in the modern calculus of variations, potential theory, mathematical programming, nonlinear functional analysis, partial differential equations, non-convex dynamical systems, control theory, numerical analysis, economics and game theory, has become a well-established and fruitful fundamental mathematical discipline. Moreover, some very active interdisciplinary fields, such as the theory of variational inequalities, nonlinear semi-group theory, and critical point theory are also closely related to the notion of the non-differentiable super-potentials. These fields, moreover, serve as a foundation for modern theoretical mechanics and computational mechanics. Applications to mechanics have proven to be an exciting and fruitful endeavor.

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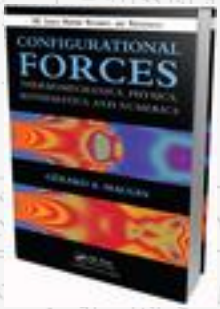

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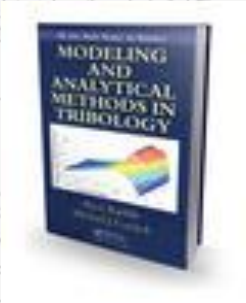

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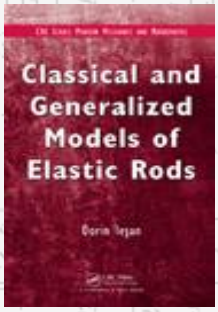

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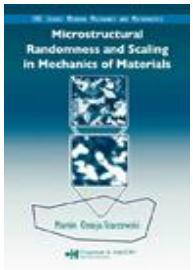

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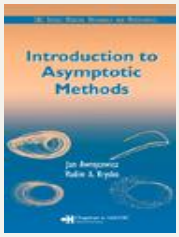

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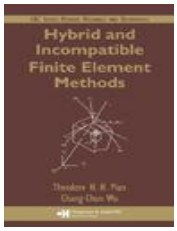

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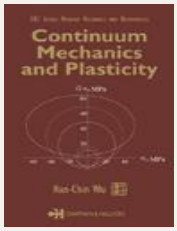

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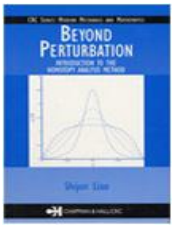

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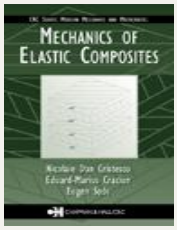

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