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Multibody Systems with Flexible Elements

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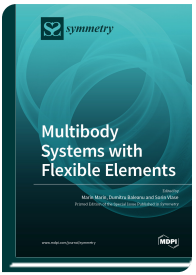

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Multibody systems with flexible elements represent mechanical systems composed of many elastic (and rigid) interconnected bodies meeting a functional, technical, or biological assembly. The displacement of each or some of the elements of the system is generally large and cannot be neglected in mechanical modeling. The study of these multibody systems covers many industrial fields, but also has applications in medicine, sports, and art. The systematic treatment of the dynamic behavior of interconnected bodies has led to an important number of formalisms for multibody systems within mechanics. At present, this formalism is used in large engineering fields, especially robotics and vehicle dynamics. The formalism of multibody systems offers a means of algorithmic analysis, assisted by computers, and a means of simulating and optimizing an arbitrary movement of a possibly high number of elastic bodies in the connection. The domain where researchers apply these methods are robotics, simulations of the dynamics of vehicles, biomechanics, aerospace engineering (helicopters and the behavior of cars in a gravitational field), internal combustion engines, gearboxes, transmissions, mechanisms, the cellulose industry, simulation of particle behavior (granulated particles and molecules), dynamic simulation, military applications, computer games, medicine, and rehabilitation.

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