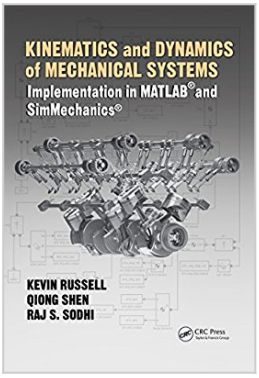

Kinematics and Dynamics of Mechanical Systems: Implementation in MATLAB® and SimMechanics®

By Kevin Russell, Qiong Shen, Rajpal S. Sodhi

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A survey of machine dynamics using MATLAB and SimMechanics, **Kinematics and Dynamics of Mechanical Systems: Implementation in MATLAB® and SimMechanics®** combines the fundamentals of mechanism kinematics, synthesis, statics and dynamics with real-world applications and offers step-by-step instruction on the kinematic, static, and dynamic analyses and synthesis of equation systems. Written for students with no working knowledge of MATLAB and SimMechanics, this book provides a basic understanding of static and dynamic mechanism analysis, moves beyond conventional kinematic concepts—factoring in adaptive programming, 2D and 3D visualization, and simulation, and equips readers with the ability to readily analyze and design mechanical systems.

Bridging the gap between theory and application, this book:

- Introduces the fundamental, kinematic, and mechanical concepts
- Presents the displacement, velocity and acceleration analysis of the plan and function generation (concepts in a branch of kinematics called synthesis) of planar four-bar mechanisms
- Explores the static and dynamic force analysis of the planar four-bar, slider-crank, geared five-bar, Watt II and Stephenson III mechanisms
- Discusses gear and radial cam systems
- Describes the displacement velocity and acceleration analysis of the spatial RRSS, RSSR and 4R spherical mechanisms
- Includes the forward and inverse kinematic analysis of industrial robots

including the Cartesian, cylindrical, spherical, and articulated and SCARA robots
- Considers the programmable quantitative methods for kinematic analysis and synthesis

Kinematics and Dynamics of Mechanical Systems: Implementation in MATLAB® and SimMechanics® provides an introduction to kinematics, presents the foundational concepts in mechanism design and analysis, and gives readers the ability to effectively implement existing mechanical system designs for a variety of applications.

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Editorial Review

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Kevin Russell, PhD, PE, is an adjunct professor in the Department of Mechanical and Industrial Engineering at New Jersey Institute of Technology. Formerly, Dr. Russell was a senior mechanical engineer at the U.S. Army Research, Development and Engineering Center at Picatinny, New Jersey. His responsibilities included the utilization of computer-aided design and modeling and simulation tools for small and medium-caliber weapon-system improvement, concept development, and failure investigations. A registered professional engineer in New Jersey, he holds several small and medium-caliber weapon-system patents and has published extensively in engineering journals in the areas of kinematic synthesis, theoretical kinematics, and machine design.

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