



# Mechanisms and Machines: Kinematics, Dynamics, and Synthesis

By Michael M. Stanisic

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MECHANISMS AND MACHINES: KINEMATICS, DYNAMICS, AND SYNTHESIS has been designed to serve as a core textbook for the mechanisms and machines course, targeting junior level mechanical engineering students. The book is written with the aim of providing a complete, yet concise, text that can be covered in a single-semester course. The primary goal of the text is to introduce students to the synthesis and analysis of planar mechanisms and machines, using a method well suited to computer programming, known as the Vector Loop Method. Author Michael Stanisic's approach of teaching synthesis first, and then going into analysis, will enable students to actually grasp the mathematics behind mechanism design. The book uses the vector loop method and kinematic coefficients throughout the text, and exhibits a seamless continuity in presentation that is a rare find in engineering texts. The multitude of examples in the book cover a large variety of problems and delineate an excellent problem solving methodology.

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## **Bibliography**

- Sales Rank: #963358 in Books
- Published on: 2014-02-28
- Original language: English
- Number of items: 1
- Dimensions: 9.20" h x .90" w x 7.50" l, .0 pounds
- Binding: Hardcover
- 432 pages

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### **Editorial Review**

#### Review

"I believe that the authors are doing an excellent job of paying attention to the audience. Considering that this text is meant for a junior level course, I particularly enjoy that there are sections where the authors are not holding the reader's hand throughout the discussion which will force the reader (student) to think about what exactly is going on. But when fundamental concepts are introduced, there is a very thorough explanation accompanied by detailed examples that would be useful for a student seeing the material for the very first time."

"The approach of using synthesis to motivate the study of analysis is meritorious. The vector loop and kinematic coefficient theory that is utilized throughout is modern and well suited to software implementation. This appeals to me as a user of such a text."

#### About the Author

Michael M. Stanisic earned the B.S.M.E., M.S.M.E. and Ph.D. degrees from Purdue University. Since 1988, he has been teaching and researching machine and manipulator design at the University of Notre Dame. He holds several patents on dextrous and singularity-free manipulator designs, which were developed with support from the National Science Foundation. He has published a number of papers concerning the application of Curvature Theory to the synthesis of mechanisms and to the control of robotic manipulators. In collaboration with the J. Stefan Institute, he has developed new types of humanoid shoulder mechanisms that include effects of human scapular motion. He has served several terms on the Mechanisms Committee of the American Society of Mechanical Engineers and has been a member of the International Scientific Committee for Advances in Robot Kinematics since 1988. At the University of Notre Dame, he has received numerous teaching awards at the departmental, college and university-wide levels.

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