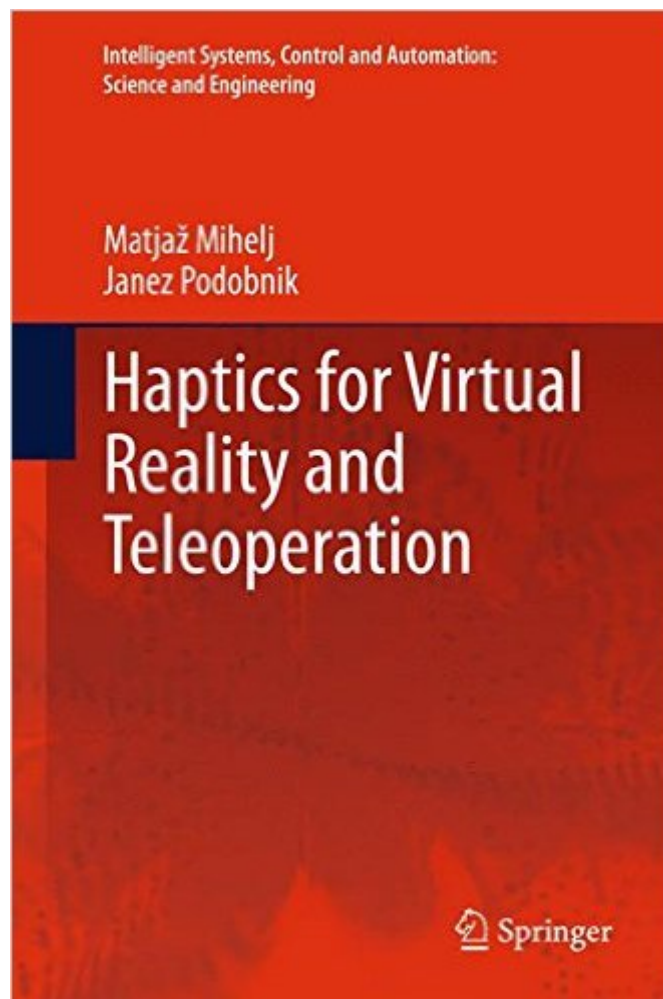# Haptics For Virtual Reality And Teleoperation (Intelligent Systems, Control And Automation: Science And Engineering)

Synopsis

This book covers all topics relevant for the design of haptic interfaces and teleoperation systems. The book provides the basic knowledge required for understanding more complex approaches and more importantly it introduces all issues that must be considered for designing efficient and safe haptic interfaces. Topics covered in this book provide insight into all relevant components of a haptic system. The reader is guided from understanding the virtual reality concept to the final goal of being able to design haptic interfaces for specific tasks such as nanomanipulation. Â The introduction chapter positions the haptic interfaces within the virtual reality context. In order to design haptic interfaces that will comply with human capabilities at least basic understanding of human sensors-motor system is required. An overview of this topic is provided in the chapter related to human haptics. The book does not try to introduce the state-of-the-art haptic interface solutions because these tend to change quickly. Only a careful selection of different kinematic configurations is shown to introduce the reader into this field. Mathematical models of virtual environment, collision detection and force rendering topics are strongly interrelated and are described in the next two chapters. The interaction with the virtual environment is simulated with a haptic interface. Impedance and admittance based approaches to haptic robot control are presented. Stability issues of haptic interaction are analyzed in details and solutions are proposed for guaranteeing stable and safe operation. Finally, haptic interaction is extended to teleoperation systems. Virtual fixtures which improve the teleoperation and human-robot cooperation in complex environments are covered next and the last chapter presents nanomanipulation as one specific example of teleoperation.

Book Information

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Customer Reviews

This book is excellent for intro-level textbook.While other books often focus on only one topic (either hardware or software) and go very deep,this book balances all topics with appropriate depth.The explanation is very clear.

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