

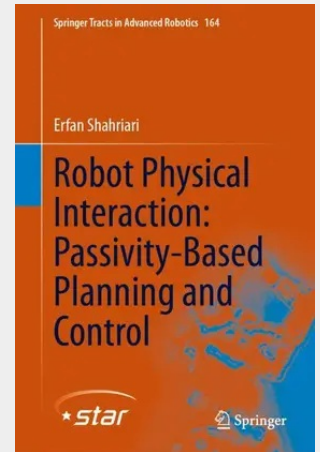
Robot Physical Interaction: Passivity-Based Planning and Control

This book presents a unified passivity-based framework for robot physical interaction, addressing the simultaneous control of force and motion, reactive policy design for human-robot scenarios, and energy-based modeling and monitoring. Rather than offering task-specific solutions, it develops a modular architecture grounded in physical principles, enabling robust and generalizable interaction control across diverse real-world settings.

Applications range from industrial manipulation and multi-manual object handling to ergonomic haptic guidance and support-adaptive robot-aided rehabilitation. The latter has been translated into a CE-certified system used in clinical settings worldwide and recognized with the 2021 euRobotics Technology Transfer Award.

The book is intended for researchers and graduate students in robotics, control theory, and human-robot interaction. It provides both rigorous theoretical foundations and practical examples, while offering an interpretable basis for future integration with data-driven and learning-based methods.

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