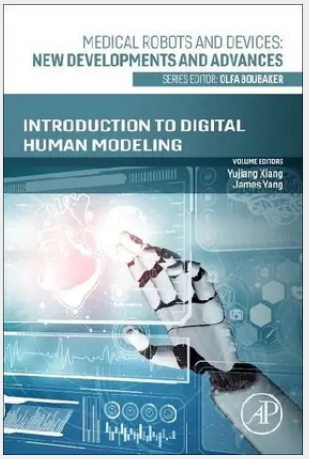
Xiang / Yang

Introduction to Digital Human Modeling

Introduction to Digital Human Modeling bridges the gap in current literature by providing a comprehensive resource on digital human modeling for beginners and researchers. The content includes step-by-step procedures for building a digital human model, fundamental human kinematics and dynamics, advanced topics such as motion prediction and injury prevention, and industrial applications. The book covers theoretical concepts and experimental validation, including human anatomy, degrees of freedom, skeletal and musculoskeletal modeling, equations of motion, reach envelopes, lifting prediction, muscle fatigue model, and injury analysis. It teaches readers how to build simulation-based human models, set up equations of motion, analyze human biomechanics, and utilize simulations and experiments to study worker injuries. Furthermore, the book introduces both fundamental and advanced digital human modeling methods and optimization techniques aimed at improving performance and preventing injuries in manual material handling, as well as addressing lifting and gait biomechanics and ergonomics.

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