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Inverse geometric model of decoupled six degree-of-freedom robots; 4.5. Inverse geometric model of general robots; 4.6. Conclusion; Chapter 5. Direct kinematic model of serial robots; 5.1. Introduction; 5.2. Computation of the Jacobian matrix from the direct geometric model; 5.3. Basic Jacobian matrix; 5.4. Decomposition of the Jacobian matrix into three matrices; 5.5. Efficient computation of the end-effector velocity; 5.6. Dimension of the task space of a robot; 5.7. Analysis of the robot workspace 5.8. Velocity transmission between joint space and task space 5.9. Static model; 5.10. Second order kinematic model; 5.11. Kinematic model associated with the task coordinate representation; 5.12. Conclusion; Chapter 6. Inverse kinematic model of serial robots; 6.1 Introduction; 6.2. General form of the kinematic model; 6.3. Inverse kinematic model for a regular case; 6.4. Solution in the neighborhood of singularities; 6.5. Inverse kinematic model of redundant robots; 6.6. Numerical calculation of the inverse geometric problem; 6.7. Minimum description of tasks; 6.8. Conclusion Chapter 7. Geometric and kinematic models of complex chain robots 7.1. Introduction; 7.2. Description of tree structured robots; 7.3. Description of robots with closed chains; 7.4. Direct geometric model of tree structured robots; 7.5. Direct geometric model of robots with closed chains; 7.6. Inverse geometric model of closed chain robots; 7.7. Resolution of the geometric constraint equations of a simple loop; 7.8. Kinematic model of complex chain robots; 7.9. Numerical calculation of q_p and q_c in terms of q_a ; 7.10. Number of degrees of freedom of robots with closed chains 7.11. Classification of singular positions

Sommario/riassunto

Written by two of Europe's leading robotics experts, this book provides the tools for a unified approach to the modelling of robotic manipulators, whatever their mechanical structure. No other publication covers the three fundamental issues of robotics: modelling, identification and control. It covers the development of various mathematical models required for the control and simulation of robots.

- World class authority
- Unique range of coverage not available in any other book
- Provides a complete course on robotic control at an undergraduate and graduate level
