

Poster Session (P)

Poster Lunch (1)

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A SOLVING METHOD FOR THE INVERSE KINEMATICS OF 7DOF SPACE MANIPULATOR

Abstract

Due to the unique redundancy feature, 7DOF manipulator is widely used in the space on-orbit service and maintenance. Taking advantage of the structural characteristics of the spherical wrist, a method is proposed to meet the need of real-time solution and singularity avoidance of the inverse kinematics. The inverse kinematics of 7DOF redundancy manipulator is decomposed reasonably into position calculation (4DOF) and attitude calculation (3DOF) in this method. The exact result of position is obtained by the fixed-joint-angle method, and then the attitude solution is finally achieved by transformation matrix. Based on Jacobean Lost-rank method, the singularity of 7DOF redundancy manipulator is analyzed and the angle of each joint is got at the condition of the rank of Jacobean matrix less than 6. MATLAB simulation results demonstrate the effectiveness of this method.