Geometric Parameter Identification of a 6-DOF Space Robot Using a Laserranger

Yu Liu

Harbin Institute of Technology

Abstract: The geometric parameters of a space robot vary with the terrific temperature change in orbit, which will causes pose (position and orientation) errors of the end-effector of a space robot, and further weaken its operability. In view of this, a new geometric parameter identification method is presented based on a laserranger fixed on the end-effector. Then the independence of the parameters is analyzed, and the identification equation of geometric parameters of the space robot is derived. According to the derived identification Jacobian matrix, the optimal measurement configuration are chosen using the Observability index O_3, subsequently through simulation the geometric parameter identification of a 6-DOF space robot is implemented, and verified in a set of independent reference configurations. The result shows that in spite of distance measurement alone pose accuracy of the space robot still has a greater improvement, so the identification method is practical and valid.