

空间转动三自由度并联微调机构设计与运动学分析

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摘要: 根据并联机器人机构综合理论,设计了一种能实现重载情况下空间转动的三自由度并联微调机构,由运动平台、固定平台、驱动支链及从动支链组成,具有平衡稳定、承载能力强、位置精度高的特点。通过对该机构的运动学研究,求出其运动学位置逆解、正解及速度解。借助Matlab软件进行了运动学仿真分析,并提供了该并联机构在盾构管片拼装机上的应用实例,证明该并联机构可实现重载情况下空间微调精确定位。According to the theories of the structure synthesis of parallel robot mechanisms, a new 3-DOF parallel manipulator with 3-rotation was synthesized and investigated. The manipulator consists of a moving platform, a fixed base, four kinematic chains of UPS and a restricted support chain. One of the four UPS legs is passive whereas each of the remaining three legs is driven by a linear actuator. To gain better understanding of the mechanisms, a methodology for analyzing the kinematics of such manipulator was presented subsequently. Finally, a case of a tunnel erector mechanical arm was used as an example to illustrate the methodology.

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