

### 3-PRR柔性并联机构动力学分析 Dynamics Analysis of 3-PRR Compliant Parallel Mechanism

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**关键词:** 柔性并联机构 自由振动 动力学分析 拉格朗日方程

**摘要:** 提出一种可应用于微/纳操作领域的3-PRR柔性并联机构,基于Euler-Bernoulli梁理论,采用假设模态法,分析支链上从动杆的柔性,结合实例说明了将从动杆视为刚性杆处理的依据。为进一步分析各构件惯量参数和柔性构件刚度对系统固有频率的影响,采用拉格朗日方程建立了修正的机构动力学振动微分方程,并结合实例进行分析,利用仿真计算验证了所建模型的有效性。 A 3-PRR compliant parallel mechanism utilizing flexure joints was proposed for 3-D nanomanipulation. Based on the assumed mode method, the passive link was modeled as Euler-Bernoulli beams with pinned-pinned boundary conditions to show the reason of the rigid equivalent. In order to analyze the effects of the inertia parameters of mobile platform and passive link, and the stiffness of flexure parts on the natural frequency of 3-PRR compliant parallel mechanism, the modified dynamics model of the 3-PRR flexure-based parallel mechanism was obtained by the Lagrange's formulation. The numerical simulations were carried out to validate the established model.

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