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多维加速度场中六维力传感器惯性耦合特性研究

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摘　要：

六维力传感器的特殊结构决定了各维间耦合存在的必然性,在多维加速度场六维力测试环境中,传感器惯性质量分布又加重了耦合的程度.本文针对多维加速度场中六维力传感器惯性耦合效应,建立传感器力学解析模型和弹性体的应力—应变关系,采用有限元方法(FEM)仿真,分析了多维加速度场中惯性力学特点与耦合效应本质特征,为加速度场中六维力传感器主动设计和惯性耦合补偿提供理论参考依据.

关键词：六维力传感器, 惯性耦合, FEM, 多维加速度场

Study on Inertia Coupling Characteristics of 6-Axis Force Sensor in Multi-Dimensional Acceleration Field

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Abstract:

The special structure of 6-axis force sensor results in the existing certainty of across-axis coupling. Testing in many multi-dimensional acceleration fields with 6-axis force sensor, the inertia mass of sensor has aggravated the degree of coupling again. Aiming at the inertia coupling effect of 6-axis force sensor in multi-dimensional acceleration field, mechanics analyzing model and stress-strain relationship of elastomer are established in the paper. And the emulations are conducted by adopting the method (FEM), the inertia mechanics characteristics, essential characteristics of coupling effect in many multi-dimensional acceleration field are all analyzed in the end. All those provide theoretical references for 6-axis force sensor's active design and inertial coupling compensation in multi-dimensional acceleration field.

Keywords: 6-axis force sensor; inertia coupling, FEM, multi-dimensional acceleration field

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