

平行梁式电容传感器极板耦合角位移计算和分析

作者: 李巨韬, 郭伟, 王建

单位: 天津大学

基金项目: 青年科学基金

摘要:

为了解决平行梁式电容称重传感器极板耦合角位移带来的输出电容值与输入载荷之间的非线性问题, 本文运用力法对平行梁式弹性体超静定结构进行了计算分析, 得出了与上下极板夹角关联的主要结构参数, 通过内力对极板角度进行了解析, 并在有限元软件中验证了计算的正确性。此结果为平行梁通过结构参数设计优化耦合角位移提供了理论方法, 并根据非平行板电容计算公式, 构建了更加精确的载荷与电容的数学模型, 为传感器输出输入特性曲线的拟合提供了依据。

关键词: 平行梁 电容传感器 角位移 非线性

Calculation and analysis of capacitive sensor plate coupling angular displacement of parallel beam

Author's Name:

Institution:

Abstract:

In order to solve nonlinear problems of the output capacitor value and the input load that plate coupling angular displacement causes of parallel beam capacitive sensor, calculating and analyzing is made in this paper to the statically indeterminate structure of parallel beam elastomer in terms of the force method, and gets the main structural parameters correlating to the angle between the upper and lower plate. The coupling angle has been calculated by internal forces, and the conclusions have been confirmed in the finite element simulation. This conclusion can provide the theoretical approach for optimizing coupling angular displacement by means of designing the structure parameters of the parallel beam, meanwhile based on Non-parallel plate capacitor formula, a more accurate analytical model of load and capacitance has been constructed, which can provide the basis for fitting of the sensor input-output characteristic curve.

Keywords: Parallel beam capacitive sensor angular displacement nonlinearity

投稿时间: 2012-12-24

[查看pdf文件](#)