

基于非线性ARX模型的静电陀螺转子微位移估计

作者：颜诗源, 张克志, 钱峰, 席涛, 张胜修

单位：陕西省西安市第二炮兵工程学院

基金项目：“十一五”国防预研项目

摘要：

静电陀螺转子大范围运动时位移具有严重的非线性和耦合性，用传统的3/4/3变换方法，检测电路无法估计转子的准确位置。本文分别利用基于小波网络和S型网络的非线性ARX模型，设计了转子位移估计环节。仿真结果表明，利用非线性ARX模型可以对转子位移进行较为准确的估计，位移检测线性范围可扩大到75%标称间隙。为了验证位移估计的实时性能，在xPC Target平台中对基于S网络的ARX模型进行实时仿真，对工程实现具有一定指导意义。

关键词：静电陀螺， 位移估计， ARX模型， xPC Target

ESG Rotor Minor Displacement Estimation Using Nonlinear ARX Model

Author's Name:

Institution:

Abstract:

ESG rotor's displacement estimation during large movement range will bring with severe nonlinearity and coupling, which makes the measurement circuit using traditional 3/4 and 4/3 transform fail to estimate its accurate position. The nonlinear ARX models based on wavelet network and sigmoid network are used to design the rotor displacement correction net. Simulation results show the nonlinear ARX model presented could estimate the rotor position accurately, while broaden the linearity range to 75% of nominal gap. The sigmoid network model is realized on the xPC Target platform to testify its real-time capability, which has significance to engineering realization.

Keywords: ESG; Displacement estimation; ARX model; xPC Target

投稿时间：2009-01-05

[查看pdf文件](#)