

工程热物理

电磁层析成像系统敏感场激励特性仿真研究

付妍, 董峰, 谭超

天津市过程检测与控制重点实验室(天津大学)

摘要:

电磁层析成像(electromagnetic tomography, EMT)技术在过程检测中具有潜在的价值。电磁传感器阵列是电磁层析成像系统的前端, 由于激励信号直接作用于电磁传感器阵列, 因此激励模式、激励信号的频率和幅值特性直接影响检测线圈获取物场信息的质量, 进而影响后续物场信息特征提取的精度。为了提高传感器阵列对物场信息分布变化的敏感程度, 提高系统的敏感性和精确度, 保证实验数据的高精度与高稳定性, 利用有限元仿真软件COMSOL Multiphysics对电磁层析成像系统的激励模式和激励频率特性进行仿真分析, 并获得激励模式及激励频率与传感器输出之间的关系, 为电磁传感器阵列的优化使用奠定基础。

关键词: 电磁层析成像技术 敏感场 激励模式 激励频率 传感器阵列

Simulation of Excitation Characteristics in Sensing Field of Electromagnetic Tomography System

FU Yan, DONG Feng, TAN Chao

Tianjin Key Laboratory of Process Measurement and Control (Tianjin University)

Abstract:

Electromagnetic tomography (EMT) has potential value in process measurement. The frontier of electromagnetic tomography system is the sensor array. Owing to the excited signal acting on the sensor array directly, the excited strategy, the excited frequency and amplitude characteristics affect the quality of the information that the detected coil acquired from the object space. Furthermore, it would affect the accuracy of the information post extracted from the object field. To improve the sensitivity of the sensor array on the changes of the object field distribution, upgrade the sensitivity and accuracy of the system and guarantee high precision and high stability of the experimental data, finite element simulation software, COMSOL multiphysics was used, to analyze the excited strategy and the characteristic of the excitation frequency of EMT. And the relationship between the output character with the excited strategy and excited frequency was acquired. Establish the foundation in optimal using of EMT sesor array was established.

Keywords: electromagnetic tomography (EMT) sensing field excited strategy excitation frequency sensor array

收稿日期 2010-07-28 修回日期 2011-01-02 网络版发布日期 2011-03-21

DOI:

基金项目:

国家自然科学基金项目(50776063); 天津市应用基础及前沿技术研究计划重点项目(08JCZDJC17700)。

通讯作者: 董峰

作者简介:

作者Email: fdong@tju.edu.cn

参考文献:

本刊中的类似文章

1. 唐志国 李成榕 黄兴泉 王伟 程序 李君.基于辐射电磁波检测的电力变压器局部放电定位研究[J]. 中国电机工程学报, 2006,26(3): 96-101
2. 高鹤明 许传龙 王式民.阵列式静电传感器灵敏场分布特性[J]. 中国电机工程学报, 2010,30(5): 76-82

扩展功能

本文信息

- ▶ Supporting info
- ▶ PDF(485KB)
- ▶ [HTML全文]
- ▶ 参考文献[PDF]
- ▶ 参考文献

服务与反馈

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ 引用本文
- ▶ Email Alert
- ▶ 文章反馈
- ▶ 浏览反馈信息

本文关键词相关文章

- ▶ 电磁层析成像技术
- ▶ 敏感场
- ▶ 激励模式
- ▶ 激励频率
- ▶ 传感器阵列

本文作者相关文章

- ▶ 付妍
- ▶ 董峰
- ▶ 谭超

PubMed

- ▶ Article by Fu,y
- ▶ Article by Dong,f
- ▶ Article by Tan,t

