

用于骨科手术机器人的电磁定位方法

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摘要：

针对计算机辅助骨科手术，提出了基于磁偶极子模型的电磁定位方法。该方法以交流线圈为发射源，由电磁定律，接收线圈会产生感应电压。由磁偶极子模型计算出磁场的空间分布，推导出包含目标位置和方向信息的方程组，利用非线性算法来解方程，从而得到一个稳定的、实时的定位方法。通过仿真验证该模型所需的方程数，实验结果表明该方法是有用的，位置误差为1.3mm，角度误差为0.0022弧度。

关键词：电磁定位；磁偶极子；LM算法

An electromagnetic locating method for orthopaedic surgery robot

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Abstract:

For computer assisted orthopedic surgery, an electromagnetic navigation method based on magnetic dipole model is proposed. Coil with AC is used as the emission source and the receiving coil induces voltage according to the law of electromagnetic induction. From the magnetic dipole model the spatial distribution of the magnetic field is calculated, and a set of equations which contain the desired information of location and orientation is established. With LM algorithms to solve the nonlinear equations a stable and real-time result can be get. The simulation results show the number of the required equations and the experiments results show that this method is effective and the location error is 1.3mm and the angle error is 0.002 radians.

Keywords: electromagnetic navigation; magnetic dipole; LM algorithm

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