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一种新的超声波绝对定位方法

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摘要 针对常规的超声波定位方法存在对决定定位精度的声速与渡越时间估算不准，导致定位精度有限的问题，提出了一种新的超声波绝对定位方法，即冗余超声波信息特殊融合法(SFMRUI)。SFMRUI利用冗余信息间的几何关系，以及冗余信息与误差间的隐含关系来修正误差。SFMRUI能很好地消除渡越时间误差，能求出波头滞后误差，并能对测量精度做出评价。实验与仿真结果证明SFMRUI法是正确的，且能大大提高绝对定位精度，与时差法和常规法相比优势很明显。

关键词 自动控制技术 超声波绝对定位 冗余超声波信息 渡越时间 波头滞后误差

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New method for ultrasonic absolute localization

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Abstract The precision of the traditional ultrasonic localization method is limited due to unsufficiently precise estimation of the sound velocity and the time of flight(TOF), therefore, a new method, the special fusion method for redundancy ultrasonic information(SFMRUI) was proposed to solve the precision problem. SFMRUI uses the geometric relationships among the redundant information and the implicit relationships between the redundant information and the error to correct the error. It is possible to eliminate the error of TOF, to calculate the wave lagging error and to estimate the measurement accuracy by SFMRUI. The experiments and simulations were performed and their results proved that the SFMRUI is correct and effective to improve the absolute localization accuracy. The proposed method is superior obviously to the traditional method and the time difference method.

Key words automatic control technology ultrasonic absolute localization redundancy ultrasonic information times of flight(TOF) wave lagging error

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