

信息技术

复杂型面工件超声自动检测中的匹配定位方法

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摘要:

为提高复杂型面工件超声自动检测的效率和通用性,研究了CAD模型已知时工件的匹配定位方法。首先使用人工缺陷贴片的超声C扫描数据获取待匹配特征点的位姿。然后以工件3个角点为特征点进行初始定位,由2个局部坐标系匹配得到初始匹配矩阵。最后根据点到曲面的最小距离原则进行精匹配定位,使用循环迭代及Menq算法进行寻优求解。实例表明,选用6个采样点时,匹配误差可控制在0.4mm以内,能很好地满足复杂型面工件超声自动检测的精度要求。

关键词:

复杂型面工件;超声检测;曲面匹配;自动定位

Matching and Localization Method in Automatic Ultrasonic Testing for Complex Surface Parts

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Abstract:

To improve the efficiency and universality of automatic ultrasonic testing for complex surface parts,a matching and localization method was proposed when the CAD model of the part to be tested was given.The position of feature points to match by C-scan ultrasonic measurement data for artificial defect on the tested part was attained firstly.Then an approximate localization method using three corner points as feature points was studied;the initial matching matrix was calculated from the matching of the two local coordinate systems.Lastly,a precise localization was acquired according to the minimum distance principle from the point to the surface,and it was calculated by the cyclic iterative method and Menq algorithm.The results of an example show that the matching error is less than 0.4mm when selecting six sampling points,which can meet the accuracy requirement in automatic ultrasonic testing for complex surface parts.

Keywords: [complex surface part](#); [ultrasonic testing](#); [surface matching](#); [automatic localization](#)

收稿日期 修回日期 网络版发布日期

DOI:

基金项目:

通讯作者:

作者简介:

作者Email:

参考文献:

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