Detection and Visualization of Manufacturing Errors of Internal Cavity Structural Parts

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Abstract

Aiming at the difficulty of manufacturing error detection of internal cavity structural parts, a detection method of common manufacturing error based on industrial CT images was proposed. Firstly, the image sequence of part scanned by an industrial CT machine is converted into a three-dimensional measurement model; Then, the registration of the three-dimensional measurement model with the original design model is completed; The surface information of the part is obtained by segmenting surfaces of the three-dimensional measurement model; Next, the datum surface is selected, the error value of the test surface is calculated after selecting datum surface; Finally, the detection result is obtained by comparing the error value with the tolerance value, analyzing the result and the areas that do not meet the tolerance requirements is visualized in the developed software system. The common manufacturing errors of complex inner cavity parts can be detected by the method, such as dimension error of length, planeness error, cylindricity error, parallelism and perpendicularity error of face-to-face, at the same time, it can intuitively show the area whose manufacturing errors in the cavity structure of the parts are not satisfied, which provides a basis for judging the quality of manufacturing and processing of parts.

Full Text

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