論文の内容の要旨
Abstract of Dissertation

Digital Shape Reconstruction of Physical Objects Using CT Images and Applications

(CT画像を用いた現物の形状復元に関する研究)

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Industrial CT has been used as a powerful non-destructive tool to examine the inner structure of an object for purposes of manufacturing quality control, shape measurements, visualization and digital shape reconstruction in order to create a digital representation in the form of a surface model from measured data of a physical objects, to meet the requirements of different areas in engineering applications in CAD/CAM/CAE with minimal amount of user assistance.

The research which this dissertation is based on aims to reconstruct digital shapes of physical objects in the form of surface mesh models using CT images of these objects. Mainly we focus on solving three main challenges, first is to segment the CT volumetric data of a mechanical assembly into its parts data taking in regard information about material and shape of the parts. Second aim is to generate the mesh surfaces models of tiny features such as gaps, clearances, and detachments which exist in between jointed parts. Third aim is to generate surface mesh models for deforming objects at any time using 4D CT images obtained at defined timestamps. The proposed methods in this dissertation are not only novel ideas, but also have high originality in aspects related to their problem formation, applications, and future possibilities for expansion.