

應用於模擬心臟跳動的模型建立與處理方法（二）

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摘 要

本研究主要是運用非接觸式的量測儀器量測心臟模型的表面之數位資料，使用光學掃描並取得 3D 點座標資料以 Rapidform XOR2 來作模型的建構，之後利用該軟體的內建工具進行網格產生 NURBS 曲面，由於曲面複雜用 Matlab 無法即時呈現心臟跳動，因此改用動畫將 Maya 軟體所調整的心臟圖片放映來呈現心臟的跳動。由於本研究所使用的心臟模型是由數片元件組成並以大頭螺絲進行模型的結合，因此，在建構這些心臟元件的 NURBS 曲面後，會產生不必要的曲面以及曲面扭曲。因此，將油性塗料漆於塑膠膜上並黏貼於模型上以減少模型的空隙並減少不必要雲點資料的取得，在建構心臟的 NURBS 曲面後，以變動控制點方式來模擬指定心臟跳動方式。

關鍵詞：NURBS 曲面，逆向工程，曲面建構

Modeling Treatment Application for the Simulation of the Human Heart Beat- Part II

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ABSTRACT

This research primarily uses non-contact digitizers to measure digital data on the surface of the heart artifact. Following the optical scan, 3D coordinates of the data are obtained using Rapidform XOR2 for model construction. This study uses the built-in tools of Rapidform XOR2 for the mesh generation of the NURBS surface. Due to the mesh surface complexity, Matlab could not show the heart beat immediately, so the heart beat was animated by shuffling the heart images in motion. The heart images are created from the scanned model using Maya. The heart model used in this research comprised screws and thereby rendered a non-closed surface fang, therefore, it creates unnecessary distortions in the surface during the construction of the NURBS heart surface. This study applies oil-based paints to the plastic film that is adhered to the model to reduce gaps and unnecessary model point cloud data. The NURBS heart surface can be changeably controlled to specify heart beat simulation.

Key Words: NURBS surface, reverse engineering, surface modeling