The Study of Use Reverse Engineering to Construct free-form

劉德進、王中行

E-mail: 8407563@mail.dyu.edu.tw

ABSTRACT

This research is integrate CAD (Computer Aided Design),CAM (Computer Aided Manufacturing), and CMM (Coordinate Measuring Machines) to construct a reverse engineering system for generating free-form curves and surfaces. The following objects will be reached. First, to draw free-form curves and surfaces by using special self designed function in CAD software. Second, to convert the CMM measured data into a CAD system by using the reverse engineering function, which provides the user a good approached profile surface and the flexibility of fine tunning the result by changing parameter. Third,to show the cutting path simulation directly in CAD system and genrate the NC progam automatically. After achieving the above aims, the NC program can via RS-232 connecting with a CNC milling machine transfer to accomplish the free-form surface machining. This thesis is based on Ferguson,Bezier,B-Spline algorithm for the analysis of curves,surfaces generation and modification. Different parameters are used to change the profile of curves and surfaces. The fitting effect of NURBS(Non-Uniform B-Spline surface) algorithm can be accomplished by using blending function of the B-Spline for the basis of the free-form surface'''' s reverse engineering system. NURBS algorithm is used as introduced the machining profile to generate cutting path and NC programming. AutoCAD is used as the curve''''s and surface''''s graphics display interface. By using AutoLISP language curves, surfaces, reverse engineering, cutting path, and NC programming model can be completed. The ZEISS CMM system is used as the free-form surface''''s measuring instrument. The output from the MasterCAM and SmartCAM compares with NC program generation from AutoCAD. After that,the correctness of real free-form surfaces machining can be complete by using CNC milling machine.

Keywords : CAD ; CAM ; CMM ; Reverse Engineering ; Curve ; Surface

Table of Contents