

Tool Path Generation Method for Freeform Surface Machining

Zuanshi Haranud, Tomohisa Tanaka, Yoshio Saito

Summary

In this research, a tool path generation method is proposed to remove excess material rapidly in a shorter tool path from the freeform mesh model in finishing process. In the proposed method the freeform surfaces are divided into different groups of patches according to the surface normal vector value. The neighboring areas on the freeform surface that approximately have the same normal vectors are clustered into one group of patch. The tool path on each patch is generated in keeping a constant scallop height value. The Scallop height is expressed in terms of three parameters, which are cutter radius, the distance between two consecutive tool path, and the inclined angle between the triangle surface and the horizontal surface. The interval of consecutive tool path is given to generate the tool path on each patch. The interval of the successive tool path is calculated from the scallop height value, which ensure the machined surface in same surface roughness and a shorter tool path compared to the isoparametric and isoplanar tool path generation methods. The experiment is implemented on 3-axis machine tool using ball-end mill. In finishing process the tool path is generated in an efficient and accurate way.

