Studies on the Postprocessor Algorithm for Multi-axis Numerical Control Machine Tools

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ABSTRACT

As compared with conventional machine tools, multi-axis machine tools can provide the flexibility of tilting the tool axis to various orientations, increase the cutting efficiency and avoid the tool collision against workpiece. Owing to the fact that multi-axis NC data can only be applied to the specified machine tool configuration and various combinations may be synthesized to multi-axis machine tool configuration, the portability of the NC data is inevitably reduced. The current domestic aerospace industries are almost the subcontracts. The NC data for specific machine tool configuration is directly provide by the customer from U.S.A., Japan etc. Once the cutting tool or the scheduling has been changed, the original NC data can not be performed and this will result in inconvenience. The conventional approach converting the NC code of different configurations should be by the reverse and forward postprocessor. Two transformation processes and the accuracy control need to be considered in this approach. Therefore, this thesis combines the forward and reverse postprocessor into a module that can convert any multi-axis NC data into any different NC code of machine tool directly. To verify the proposed algorithm, this thesis develops the windows interface converting the real NC code. Besides, the NC codes have been verified by the solid cutting simulation software through the Internet and remote control software. The results demonstrated the feasibility and effectiveness of the proposed methodology. Moreover, the developed module can make the scheduling of the factory more efficiently, increase the productivity of the machine tools and thus play the important role of the automation for multi-axis machining.

Keywords : Multi-axis Machining ; Forward Kinematics ; Reverse Kinematics ; Postprocessor

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