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Volumetric error analysis of a multi-axis machine tool machining a sculptured surface workpiece. (English) Zbl 0903.90072

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Summary: The objective of this research is to develop a geometric error model for multi-axis machine tools based on a closed-loop configuration. In this study, the geometric error model of each axis is derived by using 4×4 homogeneous transformation matrix. The ideal cutter location of the sculptured workpiece surface is calculated using the Bézier bicubic parametric surface representation method and machine geometric errors. The actual cutter locations is calculated by considering runout error of the cutting tool and machine geometric errors. Then, the step-by-step volumetric error analysis method is suggested on the basis of the closed-loop configuration of the multi-axis machine tools. The simulation study shows the simplicity and effectiveness of the proposed strategy.

MSC:

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Keywords:

geometric error model; multi-axis machine tools; ideal cutter location

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