

Form and Dimensional Accuracy of Surfaces Generated by Longitudinal Turning

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The influence of the dynamic behaviour of the machine tool/workpiece system on the surface accuracy plays an important role in finish machining. In particular, the machine tool/workpiece dynamics determines the topography of the machined surface, which is crucial in determining the quality and performance of a mechanical part. A model to predict the dynamic effects of the cutting process in turning, as part of a machining simulation framework, is presented in this paper. Thermally, kinematically and dynamically induced errors can be easily implemented into the proposed model. Finally, several examples of the use of this model under different turning conditions are presented and compared to typical machined surfaces. The proposed model can effectively compute the roughness, form and dimensional accuracy of a turned surface.

Keywords: turning, accuracy of machine tool, tool vibrations, surface topography

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