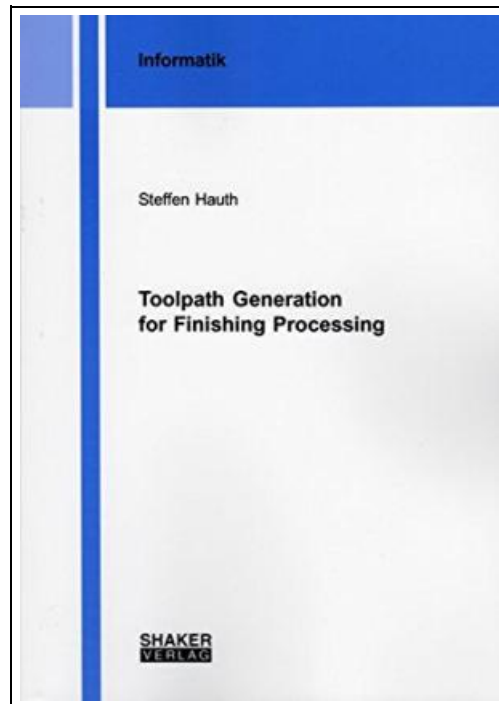


## Toolpath Generation for Finishing Processing



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Shaker Verlag Dez 2011, 2011. Buch. Book Condition: Neu. 211x149x17 mm. Neuware - For over 60 years researchers have worked on Numerical Control (NC) machines and CAx Software to implement toolpath strategies for sculpture surface manufacturing. Despite the significant progress since the beginning, automatic finishing processing for lapping or polishing is in general not possible. The quality of finishing processing relies mainly on manual skill, therefore requiring very experienced employees. To correct these deficiencies, the VDI/VDE Inno-Net 5570 Project was started, on which this thesis focuses with the algorithms for the CAD/CAM-Module to implement the toolpath strategies for finishing processing. In a first step, we investigated necessary toolpath conditions for finishing processing, which are the basis for our algorithms. It is desired that the trajectory is smooth, covers the whole surface without intersecting itself, and starts and ends at the border of the workpiece. General implementations of toolpath strategies calculate the toolpath on the surface and apply a gouge check afterwards and correct the path when necessary. However, the gouge check is computationally very expensive and difficult to implement. To avoid this step we use a precomputed configuration space (c-space), which makes the gouge check obsolete. The c-space is given in form of a regular quadrilateral height field mesh, which may be adaptively subdivided where the slope is large. Operating in a piecewise linear space suffices when using the G60-Mode. In the G60-Mode the toolpath is transferred to the machine controller as a piecewise linear curve and the controller converts it into a sufficiently smooth curve for the current processing application. This simple data structure is memory efficient and is widely used in CAD/CAM frameworks. Furthermore, it avoids the issues of patch-boundary oscillations or long stretched triangles, when operating on NURBS surfaces or triangular meshes. Our approach to fulfill the...



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