

Motion planning for 5-axis CNC machining of free-form surfaces

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ABSTRACT

Computer numerically controlled (CNC) machining is the leading subtractive manufacturing technology and even though it is in use since decades, it is far from being fully solved and still offers a rich source of challenging problems in geometric computing and motion planning. While geometric modeling of free-form surfaces is a relatively easy task for a moderately experienced modeler, manufacturing (aka rationalization) and the related problems such as optimal tool selection and its motion planning are very difficult due to very complex nature of a general free-form surface.

In this talk, I will discuss our recent advances in rationalization of free-form surfaces in the context of 5-axis flank and point CNC machining. In particular, I will discuss higher order contact between rotational cones and free-form surfaces and its application to flank CNC machining with conical tools [1], initialization strategies for flank milling with curved tools [2], and a most recent project on highly accurate point milling using toroidal tools [3].

REFERENCES

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