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Considerations on Offsetting Plane Curves

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Abstract

Offsetting operations in geometric modeling are inevitable for CAD/CAM, and graphical applications. Offsets of integral parametric polynomial curves are usually not polynomial, the offsetting operation is closed only for a subset of rational parametric curves.

The theoretical results of Pottmann et al. clarified the problem, the solution is using rational curves with rational offsets. However, this conversion of modeling software implies certain implementation costs, and might increase interrogation time.

That is why further attempts for finding less complicated, and/or less time consuming solutions, with similar practical functionality, might still be of interest.

Our paper briefly surveys the most relevant achievements in the field, suggests possible simpler alternatives, based on the interpolation of point, direction, and curvature data, at the ends of curve segments, then examines, and evaluates them in detail. Our purpose is to make it easy to understand and measure real functional and numerical limitations.

Keywords: Geometric Modeling, CAGD, CAD/CAM, Computer Graphics

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