

# Generating Distance Fields from Parametric Plane Curves

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## Abstract

Distance fields have been presented as a general representation for both curves and surfaces [1]. Using adaptive space partitioning, adaptive distance fields (ADF) found their way into various applications, such as real-time font rendering [2].

Computing approximate distance fields for implicit representations and mesh objects received much attention. Parametric curves and surfaces, however, are usually not part of the discussion directly. There are several algorithms that can be used for their conversion into distance fields, however, most of these are based on propagating some measured distances over the entire grid [3].

This talk presents a fast, geometric algorithm to compute distance fields from arbitrary parametric curves in the plane. Using the differential geometric properties of the curves, we generate simple geometric proxies that are used to approximate the distance grid of the original curve.

*Keywords:* Computer Graphics, Distance Fields, Geometric Modeling

*MSC:* 65D17, 65D18, 68U07

## References

- [1] SARAH F. FRISKEN, RONALD N. PERRY, ALYN P. ROCKWOOD, THOUIS R. JONES Adaptively sampled distance fields: a general representation of shape for computer graphics, *Proceeding SIGGRAPH '00 Proceedings of the 27th annual conference on Computer graphics and interactive techniques* 2000, Pages 249-254
- [2] GREEN, C., Improved Alpha-Tested Magnification for Vector Textures and Special Effects, *Proceeding SIGGRAPH '07 ACM SIGGRAPH 2007 courses*, 2007, pages 9-18.
- [3] MARK W. JONES, J. ANDREAS BAERENTZEN, MILOS SRAMEK 3D Distance Fields: A Survey of Techniques and Applications, *IEEE Transactions on Visualization and Computer Graphics* , Volume 12 Issue 4, July 2006, Page 581-599