



## ON THE CURVATURE PRESERVING PIECEWISE APPROXIMATION OF CLOSED PLANAR CURVES BY MINMAXION

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### ABSTRACT

The problem of fitting curves to observational data is quite old and continues to evince interest. The task is challenging when the genesis of the data is unknown. This leads to the complex problem of ordering the points and then fitting curves to these ordered points. The problem is further compounded when the points lie along non function-like curves, closed curves being a special case. This problem has been addressed earlier by us with respect to open, non function-like curves. In the present study, we solve the problem by first sampling the points along the target shape (a closed curve), ordering the sampled points, segmenting the ordered points at significant points and subsequently approximate each segment parametrically. The approach is data guided in which the entire process, right from sampling, ordering, selecting the significant points and fitting curves to each segment is fully automated. Data determines the degree of each curve segment in such a way that the first and second derivatives at junction points match giving cubic spline smoothness to the whole fitting process. The technique has been applied on some test curves and results appear encouraging. Results on one test curve are presented.

**KEYWORDS:** Curve Parametrization, Curve Segmentation, Knot Selection, Minaddition, Minmaxion, Ordering of Points, Ordering Index