

Planar B-Spline Curve Interpolation with Various Parameterizations

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ABSTRACT

In previous days of shape modelling, the shape of engineering product are represented by points. It is will make life easier if could provide mathematical equations that able define the shape of an engineering product. The aim of the project is to interpolate the set of data points with B-Spline polynomial with different parameterization method such as chord length, centripetal and equal spaced parameterization. It is found that same set of data points, it may not be able to generate same shape of curve. The objective of this project investigate how the parameterization affect the shape of curve. In this paper, mathematical formula of different parameterization will be presented. The mathematical formula of different parameterization are then be convert into Excel Macro VBA to help generate results in a more efficiency way. Several set of data points which representing different characteristic of curve such as convex shape, inflected shape and Z shape are created to test how different parameterization on curve behave on it and the characteristic and properties of different parameterization are recorded. It was found that chord length parameterization curve are normally having bulges on longer chords, Centripetal parameterization curve following longer chords closer while for equal space easily to produce sharp points or loops with higher degree of curve. Furthermore, the impact of degree on different parameterization will also be discussed in this paper.