

# GENERATION OF HIGH QUALITY PLANE CURVE

Prepared by: Seah Kok Chem

## ABSTRACT

---

Computer graphics is one of the most exciting and rapidly growing computer fields. It has now become a common element in user interfaces, data visualization, television commercials, motion pictures, and many other applications. Hardware devices and algorithms have been developed specifically to improve the effectiveness, realism, and speed of picture generation. Currently, computer graphics focuses on displaying smooth curves and surfaces, highly suitable for modeling landscapes, faces and other topologies of interest. A variety of techniques and tools are developed for curve design and generation in computer graphics which will be discussed in this report.

Curve representations provide a mapping from free parameter to the set of points on the curve. Any curve has many possible representations. For this reason, mathematicians typically are careful to distinguish between a curve and its representations. A curve must have parametric representation. Different representations of curve have advantages and disadvantages. It might seem like the easiest way to control a curve is to specify a set of points for it to interpolate. In practice, however, interpolation schemes often have undesirable properties because they have less continuity and offer no control of what happens between the points with an approximating scheme, the control points influence the shape of the curve, but do not specify it exactly. Although we give up the ability to directly specify points for the curve pass through, we gain better behavior of the curve and local control. Therefore, the most important types of approximating curves in computer graphics will be investigated in this project which is the Bezier curves and B-spline curves.

With the same set of given points set, it may or may not be able to generate the same final results. The four types of parameterization that will be further investigated in this report are the equally spaced parameterization, Chordal parameterization, Centripetal parameterization and Geometric parameterization. None of the methods mentioned will lead to an optimal parameterization corresponding to a given points set. Furthermore, investigation on the Bezier curves and B-spline curves with difference type of parameterization and different type of curves such as convex curves, inflected curves and aircraft wing curves will be discussed in this report.