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NURBS curve

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1 Introduction

A *NURBS curve*, which is an acronym for *Non-Uniform Rational B-Spline curve*, is a generalization of both <http://planetmath.org/BezierCurve> Bézier and <http://planetmath.org/B-splines> BSpline curves. NURBS are commonly used in computer graphics, computer-aided design (CAD), engineering (CAE), and manufacturing (CAM).

2 Definition

A NURBS curve is a parametric curve defined by its , a set of weighted control points, and a knot vector. It is defined as

$$c(u) = \frac{\sum_{i=0}^n N_{i,p}(u)w_iP_i}{\sum_{i=0}^n N_{i,p}(u)w_i} \quad 0 \leq u \leq 1$$

where u is the parameter, p is the , $N_{i,p}$ are the B-spline basis functions, P_i are the control points and w_i are the weights.