MEG

EXERCICIS CORBES I SUPERFICIES

1. Given the uniform cubic B-spline defined by the points P_0=(-2,-10), P_1=(-4,2), P_2=(6,5), P_3=(4,-7), P_4=(8,3), P_5=(10,-2) and the knot sequence 0,1,2,3, evaluate the position of the curve at parameter t=2.5.

2. Prove that a Bezier or uniform cubic B-spline curve lies entirely within the convex hull of its control points.

3. Analyze the effect of four collinear control points on an uniform cubic B-spline.

4. Prove that repeating the control points P_0, P_1, P_2 at the end of the sequence: P_0, P_1, P_2, ... , P_{n-2}= P_0, P_{n-1} = P_1,P_n = P_2, we obtain a closed uniform cubic B-spline.

5. a) Prove that on can force that a uniform cubic B-spline pass through a control point by giving that point a multiplicity 3: P_{i-2} = P_{i-1} = P_i. b) In particular, to force endpoints interpolation, let: P_0 = P_1 = P_2 and P_{n-2} = P_{n-1} = P_n.

6. Consider a bicubic Bezier surface S(u,v). Given any fixed u_0, 0 <= u_0 <= 1, define the u_0-slice to be the curve Q(v) = S(u_0, v). Show that Q(v) is a Bezier curve of degree 3. What are the four control points for the curve Q(v)?