

2008 Paper 8 Question 7

Advanced Graphics

(a) Place four control points P_1, P_2, P_3, P_4 in a square. For each of the following knot vectors, for the quadratic B-spline ($k = 3$), sketch (i) the four basis functions and (ii) the B-spline curve defined by the four control points and four basis functions, marking the location of the knots and the value of t at each knot.

(α) [1, 2, 3, 4, 5, 6, 7]

(β) [1, 2, 3, 3, 4, 5, 6]

(γ) [1, 2, 3, 3, 3, 4, 5]

[12 marks]

(b) Describe, in detail, an algorithm to find the intersection point between an arbitrary ray and an arbitrary triangle in 3D. Ensure that you define all parameters. [8 marks]