

1999 Paper 7 Question 11

Advanced Graphics

Give a parametric definition of a torus centred at the origin and aligned with the coordinate axes. [4 marks]

Outline how you would find the first intersection point, if any, of a ray with the torus from the previous part. [You may assume that you are provided with functions to find the roots of linear, quadratic, cubic and quartic equations.] [4 marks]

Show how to construct a circle using non-uniform rational B-splines (NURBS). [8 marks]

Show how the circle definition from the previous part can be used to define a NURBS torus. [You need explain only the general principle and the location of the torus's control points.] [4 marks]