

1999 Paper 4 Question 10

Computer Graphics and Image Processing

Give the formula for a Bezier cubic curve.

Derive the conditions necessary for two Bezier cubic curves to join with (a) just C^0 -continuity and (b) C^1 -continuity.

Give a geometric interpretation of each condition in terms of the locations of control points.

Explain (mathematically) why a Bezier cubic curve is guaranteed to lie within the convex hull of its control points. [8 marks]

Basic ray tracing uses a single sample per pixel. Describe *four* distinct reasons why one might use multiple samples per pixel. Explain the effect that each is trying to achieve, and outline the mechanism by which it achieves the effect. [8 marks]

Describe the differences in the computational complexity of the depth sort and binary space partition (BSP) tree algorithms for polygon scan conversion.

If you were forced to choose between the two algorithms for a particular application, what factors would be important in your choice? [4 marks]