

COMPUTER SCIENCE TRIPOS Part IB – 2013 – Paper 4

3 Computer Graphics and Image Processing (PR)

- (a) Explain the difference between an *explicit formula*, a *closed form* and a *parametric form* for a curve in two dimensions. Give examples to illustrate your answer. [3 marks]
- (b) Explain the term *mathematical continuity* (C_n) when joining two curves. [2 marks]
- (c) Give the formulation of a cubic Bézier curve in two dimensions, explaining the rôle of the parameter and control points. [4 marks]
- (d) Consider the joint between two cubic Bézier curves. State and prove constraints on their control points to ensure:
- (i) C_0 continuity at the joint; [2 marks]
 - (ii) C_1 continuity at the joint; [4 marks]
 - (iii) C_2 continuity at the joint. [3 marks]
- (e) Discuss the implications of requiring C_3 continuity at the joint between two cubic Bézier curves. [2 marks]