

## 2011 Paper 7 Question 3

### Advanced Graphics

- (a) Describe the key features of B-splines that make them useful for representing curves in computer-aided design (CAD). [3 marks]
- (b) Derive and graph the quadratic Bézier basis functions using the standard B-spline method and the knot vector  $[0, 0, 0, 1, 1, 1]$ . [5 marks]
- (c) Describe Chaikin's corner-cutting subdivision method that produces the quadratic Bézier curve in the limit. [5 marks]
- (d) Describe the Doo–Sabin subdivision scheme, that is the generalisation of Chaikin's method to the bi-variate case able to represent surfaces with extraordinary vertices. [7 marks]