A program is required to draw an arc from \((0,1)\) to \((1,0)\) of the circle centred at the origin with unit radius.

\((a)\) One approach would be to draw a segment of the cubic Overhauser curve defined by \((-1,0), (0,1), (1,0)\) and \((0,-1)\).

\((i)\) Explain how a segment of an Overhauser curve in general can be represented as an Hermite cubic and so as a Bézier cubic. \([4\text{ marks}]\)

\((ii)\) Derive the formula for the resulting Bézier curve, \(P(t)\). \([3\text{ marks}]\)

\((iii)\) Calculate the coordinates of \(P(\frac{1}{2})\). How large is the error? \([Hint: \sqrt{2} \approx 1.414.]\) \([3\text{ marks}]\)

\((b)\) Calculate revised control points for the Bézier curve so that it models the circular arc more accurately. \([4\text{ marks}]\)

\((c)\) Describe in outline an alternative way of efficiently drawing the arc by calculating the pixels that lie on it directly. \([6\text{ marks}]\)