

Pbm Sept 16 cap{4,6}930: Geometric Modeling

Name:

If you need to make simple, reasonable assumptions to arrive at an answer, state any such assumption.

An answer 'yes' or 'no' is worth 0 points if it does not explain the reasoning.

The Bernstein family wants to install a lens-shaped pool in their backyard. The perimeter (boundary) of the pool consists of two pieces, \mathbf{c}^1 and \mathbf{c}^2 , that are polynomial pieces of degree 4 in Bernstein-Bézier (BB) form. The Bernstein's already decided on the two middle BB coefficients and the two end BB coefficients:

$$\mathbf{c}_0^1 := (2, 0), \mathbf{c}_2^1 := (0, 2), \mathbf{c}_0^2 := (-2, 0), \mathbf{c}_2^2 := (0, -2). \quad (1)$$

a. (10+10 points)

Determine the remaining coefficients to make the pool boundary C^2 .

b. (10+20+10 points)

Compute, with all intermediate operations in BB form, the area of the pool using the formula: $\text{Area} = \int_{\Omega} x(u)y'(u)du$ where Ω is the union of the domains of the two maps.