

Programming #1: Part I (4190.562)

Due: March 16, 2016

A cubic Bézier curve $C(t) = \sum_{l=0}^3 \mathbf{b}_l B_l^3(t) = \sum_{l=0}^3 (x_l, y_l) B_l^3(t) = (x(t), y(t))$, $0 \leq t \leq 1$, can be used for the deformation of a planar shape given as a point cloud: $\{\mathbf{p}_k \mid k = 1, \dots, N\}$.

Part I: For each point \mathbf{p}_k , compute the closest point $C(t_k)$ and bind \mathbf{p}_k to the local frame at $C(t_k)$ (determined by the tangent and normal directions). When we edit the cubic Bézier curve $C(t)$, each point \mathbf{p}_k should move to the corresponding position in the new local frame at $C(t_k)$ under the shape deformation of $C(t)$.