

Q1 c)

Prove that two successive rotation transformations are additive

Let 1st rotation matrix be

$$R1 = \begin{bmatrix} \cos(t1) & \sin(t1) & 0 \\ -\sin(t1) & \cos(t1) & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

and 2nd rotation matrix be

$$R2 = \begin{bmatrix} \cos(t2) & \sin(t2) & 0 \\ -\sin(t2) & \cos(t2) & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

So, The composition rotation matrix is computed as follows,

$$Rm = R1.R2$$

$$Rm = \begin{bmatrix} \cos(t1) & \sin(t1) & 0 \\ -\sin(t1) & \cos(t1) & 0 \\ 0 & 0 & 1 \end{bmatrix} * \begin{bmatrix} \cos(t2) & \sin(t2) & 0 \\ -\sin(t2) & \cos(t2) & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

Hence,

$$Rm = \begin{bmatrix} \cos(t1+t2) & \sin(t1+t2) & 0 \\ -\sin(t1+t2) & \cos(t1+t2) & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

Hence, we can say that two successive rotation Transformations are additive.

Q 3 a) Bezier Curve

u	X	Y
0	25	25
0.1	30.87	29.17
0.2	36.56	32.56
0.3	42.19	34.99
0.4	47.88	36.28
0.5	53.75	36.25
0.6	59.92	34.72
0.7	66.51	31.51
0.8	73.64	26.44
0.9	81.43	19.33
1	90	10