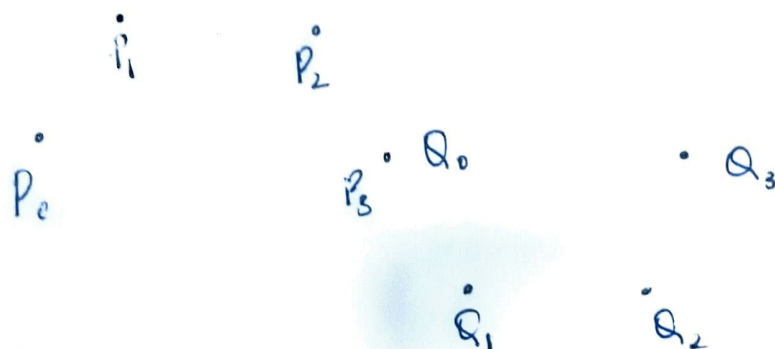


CG Assignment by

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7 points

① Positional continuity

$$P_3 = Q_0, \text{ so done.}$$

② Tangential continuity

$$P(t) = (1-t)^3 P_0 + 3t(1-t)^2 P_1 + 3t^2(1-t) P_2 + t^3 P_3$$

$$Q(t) = (1-t)^3 Q_0 + 3t(1-t)^2 Q_1 + 3t^2(1-t) Q_2 + t^3 Q_3$$

we know $P_3 = Q_0$

$$P(1) = P_3 = Q_0 = Q(0)$$

$$\text{we want } \frac{dP}{dt}(1) = \frac{dQ}{dt}(0) \quad \left[\text{same velocity} \right] \quad \left[\text{at } P_3, Q_0 \right]$$

$$\Rightarrow -3P_2 + 3P_3 = -3Q_0 + 3Q_1$$

$$\Rightarrow \boxed{Q_1 = 2Q_0 - P_2}$$

③ Curvature continuity

we know $Q_0 = P_3$

and $\cancel{Q_0} = Q_1 = 2Q_0 - P_2$

we want $\frac{d^2 P}{dt^2}(1) = \frac{d^2 Q}{dt^2}(0) \left[\begin{array}{l} \text{same accel.} \\ \text{at } Q_0, P_3 \end{array} \right]$

$$\Rightarrow 6P_1 - 12P_2 + 6P_3 = 6Q_0 - 12Q_1 + 6Q_2$$

$$\Rightarrow P_1 - 2P_2 = Q_2 - 2Q_1$$

$$\Rightarrow \boxed{Q_2 = P_1 + 4(P_3 - P_2)}$$