

Systems Review Quiz 4

Question 1

$$\begin{array}{ccc} \cos t = 1 & \sin t = 0 & t^2 + 1 = 1 \\ t = 0 & t = 0 & t = 0 \end{array}$$

$$r(t) = \sin t \mathbf{i} + \cos t \mathbf{j} + t \mathbf{k} \quad r'(0) = 0, 1, 0$$

$$(1, 0, 1) + (t) (0, 1, 0) \rightarrow (1, t, 1)$$
$$x = 1 \quad y = t \quad z = 1$$

Question 2

$$\int (t \mathbf{i} + 2t \mathbf{j} + (t+1) \mathbf{k}) dt = \frac{t^2}{2} \mathbf{i} + t^2 \mathbf{j} + \frac{t^2}{2} \mathbf{k} + t \mathbf{k} + C$$

$$r(0) = 1 \mathbf{i} + 2 \mathbf{j} + 3 \mathbf{k} = C \quad r(t) = \frac{t^2}{2} \mathbf{i} + t^2 \mathbf{j} + \frac{t^2}{2} \mathbf{k} + t \mathbf{k} + C$$
$$+ 1 \mathbf{i} + 2 \mathbf{j} + 3 \mathbf{k}$$

$$r(t) = \left(1 + \frac{t^2}{2}\right) \mathbf{i} + (2 + t^2) \mathbf{j} + \left(3 + \frac{t^2}{2} + t\right) \mathbf{k}$$