

Question 4

Given Parabola $b = C + Dt + Et^2$ Pass through, four data points $(t, b) = (-1, 0) (0, 1) (1, 3) (2, k)$

Let, equation $Ax = b$

$$\Rightarrow \text{So, } 0 = C - D + E$$

$$1 = C$$

$$3 = C + D + E$$

$$k = C + 2D + 4E$$

where system is

$$\begin{bmatrix} 1 & -1 & 1 \\ 1 & 0 & 0 \\ 1 & 1 & 1 \\ 1 & 2 & 4 \end{bmatrix} \begin{bmatrix} C \\ D \\ E \end{bmatrix} = \begin{bmatrix} 0 \\ 1 \\ 3 \\ k \end{bmatrix}$$

By using 3 equations, we get

$$C = 1, -D + E = -1, D + E = 2$$

$$C = 1, E = \frac{1}{2}, D = \frac{3}{2}$$

Thus, $k = C + 2D + 4E$

$$k = 1 + 2\left(\frac{3}{2}\right) + 4\left(\frac{1}{2}\right)$$

$$k = 1 + 3 + 2 = 6$$

$\Rightarrow k = 6$, which is value for above system.