

Akshay Gokhale

18/5/2020

Computer Science

MAT 205

Question 1

State Cayley Hamilton theorem

It states that every square matrix over a commutative ring satisfies its own characteristic equation

Question 2

Characteristics of the polynomial

$$\begin{bmatrix} 2 & 27 & 0 \\ 0 & 4 & 40 \\ 0 & 3 & 30 \end{bmatrix}$$

$$\det(A) = 2 - 4 - 30 = -32$$

|A|

$$\begin{array}{c|cc|cc|cc|cc} 2 & 4 & 40 & -27 & 0 & 40 & +0 & 0 & 4 \\ 0 & 3 & 30 & & 0 & 30 & & 0 & 3 \end{array}$$

$$2(120 - 120) - 27(0 - 0) + 0(0 - 0)$$

$$2(0) - 27(0) + 0(0)$$

$$0 - 0 + 0$$

$$= 0$$

$$A_{11} = (-1)^2 \begin{vmatrix} 4 & 40 \\ 3 & 30 \end{vmatrix} = 1(120 - 120) \\ = 1(0) = 0$$

$$A_{22} = (-1)^4 \begin{vmatrix} 2 & 0 \\ 0 & 30 \end{vmatrix} = 1(60 - 0) \\ = 1(60) = 60$$

$$A_{33} = (-1)^6 \begin{vmatrix} 2 & 7 \\ 0 & 4 \end{vmatrix} = 1(8 - 0) \\ = 1(8) = 8$$

$$t^3 - 10t^2 + (A_{11} + A_{22} + A_{33})t - (P)$$

$$t^3 + 32t^2 + (0 + 60 + 8)t - 0$$

$$t^3 + 32t^2 + 68t - 0$$