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Homework 5

(1) $6a(n-1) + a(n+3) + 5a(n+1) = 0$

$$a(n+4) = 0 \cdot a(n+3) - 5a(n+2) + 0 \cdot a(n+1) - 6a(n)$$

b.
$$a(n) = \begin{bmatrix} a(n+3) \\ a(n+2) \\ a(n+1) \\ a(n) \end{bmatrix} \quad a(n+1) = \begin{bmatrix} a(n+4) \\ a(n+3) \\ a(n+2) \\ a(n+1) \end{bmatrix} = \begin{bmatrix} 0 & -5 & 0 & -6 \\ 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}$$

c. $a(0)=0, a(1)=2, a(2)=3, a(3)=4$ Find $a(5)$

(i) $a(4) = -5a(2) - 6a(0) = -5 \cdot 3 - 6 \cdot 0 = -15$

$$a(5) = -5a(3) - 6a(1) = -5 \cdot 4 - 6 \cdot 2 = -32$$

(ii)
$$a(n) = \begin{bmatrix} a(n+3) \\ a(n+2) \\ a(n+1) \\ a(n) \end{bmatrix} \quad a(0) = \begin{bmatrix} 4 \\ 3 \\ 2 \\ 0 \end{bmatrix}$$

$$Aa(0) = \begin{bmatrix} -15 \\ 4 \\ 3 \\ 2 \end{bmatrix} \quad Aa(1) = \begin{bmatrix} -32 \\ -15 \\ 4 \\ 3 \end{bmatrix} \quad a(5) = -32$$

(2)

$$L = \begin{bmatrix} 0 & 1.5 & 0.9 & 0.5 & 0.3 \\ 0.8 & 0 & 0 & 0 & 0 \\ 0 & 0.1 & 0 & 0 & 0 \\ 0 & 0 & 0.6 & 0 & 0 \\ 0 & 0 & 0 & 0.6 & 0 \end{bmatrix}$$