Tarea 4 (Algebra lineal)

6.
$$\begin{bmatrix} a_{00} & a_{01} & a_{02} & \cdots & a_{0(n-1)} & a_{0n} \\ 0 & a_{11} & a_{12} & \cdots & a_{1(n-1)} & a_{1n} \\ 0 & 0 & a_{22} & \cdots & a_{2(n-1)} & a_{2n} \\ \vdots & \vdots & \vdots & \ddots & \vdots & \vdots \\ 0 & 0 & 0 & \cdots & a_{(n-1)(n-1)} & a_{(n-1)n} \\ 0 & 0 & 0 & \cdots & 0 & a_{nn} \end{bmatrix} \begin{bmatrix} x_0 \\ x_1 \\ x_2 \\ \vdots \\ x_{n-1} \\ x_n \end{bmatrix} = \begin{bmatrix} b_0 \\ b_1 \\ b_2 \\ \vdots \\ b_{n-1} \\ b_n \end{bmatrix}$$

$$a_{nn} \cdot x_n = b_n \rightarrow x_n = \frac{b_n}{a_{nn}}$$

$$a_{ii} x_i + \sum_{j=i+1}^{n} a_{ij} x_j = b_i$$

$$a_{ii} x_i = b_i - \sum_{j=i+1}^{n} a_{ij} x_j$$

$$x_i = \frac{b_i - \sum_{j=i+1}^{n} a_{ij} x_j}{a_{ii}}$$

5.
$$A = \begin{bmatrix} a_{00} & 0 & 0 & \cdots & 0 \\ a_{10} & a_{11} & 0 & \cdots & 0 \\ a_{20} & a_{21} & a_{22} & \cdots & 0 \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ a_{(n-1)0} & a_{(n-1)1} & a_{(n-1)2} & \cdots & a_{(n-1)(n-1)} \end{bmatrix}$$

$$a_{00} x_0 = b_0 \longrightarrow x_0 = \frac{b_0}{a_{00}}$$

$$a_{10} x_0 + a_{11} x_1 = b_1 \longrightarrow x_1 = \frac{b_1 - a_{10} x_0}{a_{11}}$$

$$a_{20} x_0 + a_{21} x_1 + a_{22} x_2 = b_2 \rightarrow x_2 = \frac{b_2 - a_{20} x_0 - a_{21} x_1}{a_{22}}$$

$$a_{ii} x_i = b_i - \sum_{j=0}^{i-1} a_{ij} x_j \longrightarrow x_i = \frac{b_i - \sum_{j=0}^{i-1} a_{ij} x_j}{a_{ii}}$$

1.

$$x_{n+1} = 4x_n - x_n^2, \quad x_0 = 4\,\text{sen}^2(\theta)$$

$n=0$

$$x_0 = 4\,\text{sen}(\theta)$$

$n=1$

$$x_1 = 4x_0 - x_0^2 = 4(4\,\text{sen}^2(\theta)) - (4\,\text{sen}^2(\theta))^2 = 16\,\text{Sen}^2(\theta) - 16\,\text{sen}^4(\theta) = 16\,\text{sen}^2(\theta)(1-\text{Sen}^2(\theta)) = 16\,\text{sen}^2(\theta)\cos^2(\theta)$$

$n=2$

$$x_2 = 4x_1 - x_1^2 = 4(16\,\text{Sen}^2(\theta)\cos^2(\theta)) - 16\,\text{sen}^2(\theta)\cos^2(\theta))^2$$

• Identidad del angulo doble $\text{sen}^2(2\theta)$

entonces

$$x_n = 4\,\text{sen}^2(2^n(\theta))$$

$$x_{n+1} = 4\,\text{sen}^2(2^{n+1}(\theta))$$

$$x_{n+1} = 4x_n - 4x_n^2, \quad x_0 = \text{Sen}^2(\theta)$$

$n=0$

$$x_0 = \text{Sen}^2(\theta)$$

$n=1$

$$x_1 = 4x_0 - 4x_0^2 = 4\,\text{sen}^2(\theta) - 4\,\text{sen}^4(\theta) = 4\,\text{Sen}^2(\theta)(1-\text{Sen}^2(\theta)) = 4\,\text{Sen}^2(\theta)\cos^2(\theta)$$

$n=2$

$$x_2 = 4x_1 - 4x^2 = 4(4\,\text{sen}^2(\theta)\cos^2(\theta)) - 4(4\,\text{sen}^2(\theta)\cos^2(\theta))^2$$

$$x_n = \text{Sen}^2(2^n(\theta))$$

$$x_{n+1} = \text{Sen}^2(2^{n+1}(\theta))$$