Punto 4 algebra lineal

$$x_i = b - \sum_{j=0}^{i-1} A_{ij} x_i$$

Supongo $A = M(n \times n)$ talque $Ax = b$

$$\Rightarrow \begin{bmatrix} A_{11} & 0 & \cdots & 0 \\ A_{21} & A_{22} & \cdots & 0 \\ \vdots & \vdots & & \\ A_{m1} & A_{m2} & \cdots & A_{nm} \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_n \end{bmatrix} = \begin{pmatrix} b_1 \\ b_2 \\ \vdots \\ b_n \end{pmatrix}$$

$\Rightarrow A_{11} \cdot X_1 = b_n$

$A_{21} X_1 + A_{22} X_2 = b_2$

$\vdots \qquad \vdots$

$A_{m1} X_1 + A_{m2} X_2 \cdots A_{nm} X_n = b_n$

$\Rightarrow$ Si $m = n$ $\quad A_{ij} = 1$

$\Rightarrow X_1 = b_1$

$A_{21} X_1 + X_2 = b_2$

$\vdots$

$A_{m1} X_1 + A_{n2} X_2 \cdots X_n = b_n$

$\Rightarrow$ Despejamos X_n

$A_{m1} X_1 + A_{n2} X_2 \cdots X_n = b_n$

$\sum_{n=0}^{m-1} A_{mn} X_n + X_n = b_n$

$X_n = \sum_{n=0}^{m-1} A_{mn} X_n - b_n$

Punto 5 de algebra lineal

$$X_i = b - \sum_{j=i+2}^{n} A_{ij} X_j \qquad i = n, n-1, \ldots 0$$

Suponga $A = M(n \times m)$ x un vector de n filas y b uno de m filas

$\Rightarrow$ tal que $Ax = b$

$$\begin{bmatrix} A_{11} & A_{12} & \cdots & A_{1n} \\ 0 & A_{22} & \cdots & A_{2n} \\ \vdots & \vdots & & \vdots \\ 0 & 0 & \cdots & A_{nn} \end{bmatrix} \begin{pmatrix} X_1 \\ X_2 \\ \vdots \\ X_n \end{pmatrix} = \begin{pmatrix} b_1 \\ b_2 \\ \vdots \\ b_n \end{pmatrix}$$

$A_{11} X_1 + A_{12} X_2 \cdots A_{nn} X_n = b_1$

$A_{22} X_2 \cdots A_{2n} X_n = b_2$

$A_{nm} X_n = b_n$

$\Rightarrow$ Despejamos X_n

$A_{11} X_1 + A_{12} X_2 \cdots A_{nn} X_n = b_1$

$\sum_{n=0}^{m-1} A_{mn} X_n + A_{nn} X_n = b_n$

$$X_n = \underbrace{\sum_{m=n+1}^{K} A_{mn} X_n - b_n}_{A_{nn}} \Rightarrow \text{tq } n = K, K-1 \ldots, 0)$$

Punto 6 algebra lineal

$$\frac{dx}{da_0} = \sum_i \frac{d}{da_0} \left[(y_i - (a_i x_i + a_0)^2 \right]$$

$\Rightarrow \sum_i (y_i - (a_i x_i + a_0)) = 0$

$\Rightarrow \sum_i y_i - \sum d_i x_i - \sum_i^N a_0 = 0$

$\Rightarrow \sum y_i - a_i \sum x_i - N a_0 = 0$

$\Rightarrow \bar{y} - a_i \bar{x} \cdot a_0 = 0$

$a_0 = \bar{y} - a_i \bar{x}$

$\Rightarrow \frac{dx^2}{da_i} = \sum_i \frac{d}{da_i} \left[(y_i - (a_i x_i + a_0)^2 \right] = 0$

$\Rightarrow \sum_i 2(y_i - (a_i x_i + a_0))(-x_i) = 0$

$\Rightarrow \sum_i y_i x_i a_i \sum_i x_i^2 + a_0 \sum x_i = 0$

$\Rightarrow -2 \sum x_i y_i + a_i \sum x_i^2 + \left[\frac{1}{N} \sum_i y_i + \frac{a_i}{N} \sum x_i \right] \sum_i x_i = 0$

$\Rightarrow a_i \left[\sum_i x_i^2 + \frac{1}{N} \left(\sum_i x_i \right)^2 \right]$

$\gamma\, 2 \sum x_i y_i + \frac{1}{N} \sum_i x_i \sum_i y_i$

$$\Rightarrow a_i = \frac{2 \sum x_i y_i + \frac{1}{N} \sum_i x_i \sum_i y_i}{\sum_i x_i^2 + \frac{1}{N} \left(\sum_i x_i \right)^2}$$

$\Rightarrow x^2 (a_0, a_1, a_2) = \sum_{i=1}^{N} (y_i - (a_0 + a_1 x_i + a_2 x_i^2))^2$

$\Rightarrow \frac{dx^2}{da_0} = \sum \left[\frac{d}{da_0} \left[(y_i + a_0 + a_1 x_i + a_2 x_i^2)^2 \right] \right]$

$\Rightarrow \sum \left[2(y_i - (a_0 + a_1 x_i + a_2 x_i^2)) - 1 \right] = 0$

$\Rightarrow \sum_{i=1}^{N} a_0 + a_1 x_i + a_2 x_i^2 = y_i$

$x_i \sum_{i=1}^{N} a_0 x_i + a_1 x_i^2 + a_2 x_i^3 = x_i y_i$

$x_i^2 \sum_{i=1}^{N} a_0 x_i^2 + a_1 x_i^3 + a_2 x_i^4 = x_i^2 y_i$