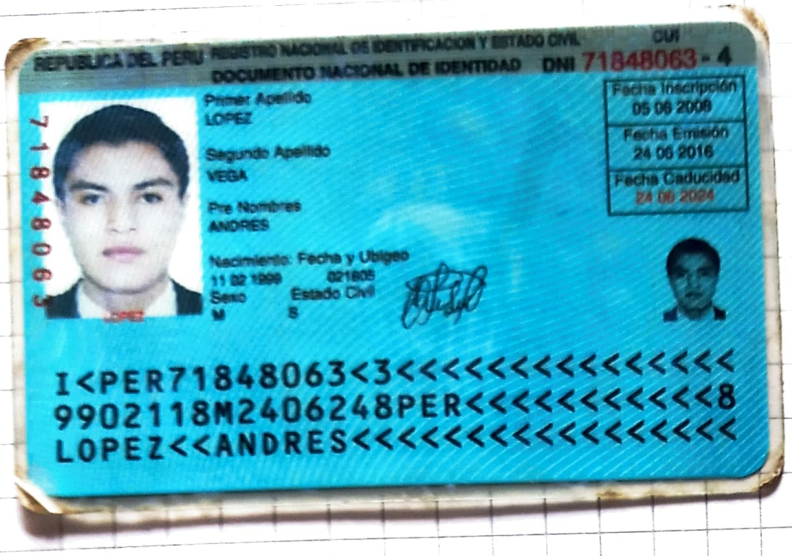

Andres Lopez Vega

pregunta 3

$$\int_{-1}^{1} \frac{1}{2\pi} e^{-\frac{x^2}{2}} dx$$

① $h = \frac{+1-(-1)}{4} = 0.5$

x	x_0	x_1	x_2	x_3	x_4
	-1	-0.5	0	0.5	1

$$I = \frac{h}{3}\left(f(x_0) + f(x_4) + 4\left(f(x_1) + f(x_3)\right) + 2f(x_2)\right)$$

$$I = \frac{0.5}{3}\left(0.2419 + 0.2419 + 4\left(0.35 + 0.35\right) + 2\left(0.3989\right)\right)$$

$$I = 0.6802667$$

pregunta 5A

modelo no lineal $\Rightarrow$ modelo lineal

$$y = re^{sx} = g(x)$$

① $Ln(y) = Ln(re^{sx})$

$Ln(y) = Ln(r) + Ln e^{s}$

$Ln(y) = Ln(r) + sx$

modelo lineal

$\underbrace{Ln(r)}_{a_0} + \underbrace{s}_{a_1} x = Ln(y)$

FORMA MATRICIAL

$$\begin{pmatrix} 1 & x_1 \\ 1 & x_2 \\ 1 & x_3 \\ \vdots & \vdots \\ 1 & x_n \end{pmatrix} \begin{pmatrix} a_0 \\ a_1 \end{pmatrix} = \begin{pmatrix} Ln(y_1) \\ Ln(y_2) \\ \vdots \\ Ln(y_n) \end{pmatrix}$$

$$\underbrace{\begin{pmatrix} 1 & 6 \\ 1 & 10 \\ 1 & 12 \\ 1 & 14 \\ 1 & 16 \\ 1 & 20 \end{pmatrix}}_{A} \underbrace{\begin{pmatrix} a_0 \\ a_1 \end{pmatrix}}_{x} = \underbrace{\begin{pmatrix} 3.15 \\ 2.979 \\ 2.9189 \\ 2.8678 \\ 2.8219 \\ 2.7663 \end{pmatrix}}_{b}$$

$Ax = b$ sistema lineal sobredeterminado

donde: $a_0 = Ln(r)$

$a_1 = s$

5B

$$A = \begin{pmatrix} 1 & 6 \\ 1 & 10 \\ 1 & 12 \\ 1 & 14 \\ 1 & 16 \\ 1 & 20 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \end{pmatrix}; \quad a_2 = \begin{pmatrix} 6 \\ 10 \\ 12 \\ 14 \\ 16 \\ 20 \end{pmatrix}$$

* $\hat{q}_1 = a_1$, $q_1 = \frac{\hat{q}_1}{\|q_1\|}$

$$\hat{q}_1 = \begin{pmatrix} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \end{pmatrix}, \quad q_1 = \frac{\begin{pmatrix} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \end{pmatrix}}{2.4495} = \begin{pmatrix} 0.408 \\ 0.408 \\ 0.408 \\ 0.408 \\ 0.408 \\ 0.408 \end{pmatrix}$$

* $\hat{q}_2 = a_2 - \langle a_2, q_1 \rangle q_1$, $q_2 = \frac{\hat{q}_2}{\|q_2\|}$

$$\hat{q}_2 = \begin{pmatrix} 6 \\ 10 \\ 12 \\ 14 \\ 16 \\ 20 \end{pmatrix} - \underbrace{\begin{pmatrix} 6 \\ 10 \\ 12 \\ 14 \\ 16 \\ 20 \end{pmatrix} \cdot \begin{pmatrix} 0.408 \\ 0.408 \\ 0.408 \\ 0.408 \\ 0.408 \\ 0.408 \end{pmatrix}}_{31.824} \times \begin{pmatrix} 0.408 \\ 0.408 \\ 0.408 \\ 0.408 \\ 0.408 \\ 0.408 \end{pmatrix}$$

$$\hat{q}_2 = \begin{pmatrix} 6 \\ 10 \\ 12 \\ 14 \\ 16 \\ 20 \end{pmatrix} - \begin{pmatrix} 12.984 \\ 12.984 \\ 12.984 \\ 12.984 \\ 12.984 \\ 12.984 \end{pmatrix} = \begin{pmatrix} -6.984 \\ -2.984 \\ -0.984 \\ 1.016 \\ 3.016 \\ 7.016 \end{pmatrix}$$

$$q_2 = \frac{\vec{q}_2}{10.8628} \Rightarrow q_2 = \begin{bmatrix} -0.6429 \\ -0.2746 \\ -0.09058 \\ 0.09353 \\ 0.27764 \\ 0.6458 \end{bmatrix}$$

$$R = Q^T \times A = \begin{bmatrix} 2.448 & 31.824 \\ 0 & 10.9773 \end{bmatrix}$$

$$A = \underbrace{\begin{bmatrix} 0.408 & -0.6429 \\ \vdots & -0.2746 \\ \vdots & \vdots \\ 0.408 & 0.6458 \end{bmatrix}}_{Q} \underbrace{\begin{bmatrix} 2.448 & 31.824 \\ 0 & 10.9773 \end{bmatrix}}_{R}$$

Pregunta 5c

$$Rx = Q^T b \Rightarrow x = inv(R) \times Q^T \times b$$

$$\begin{bmatrix} 2.448 & 81.824 \\ 0 & 10.9773 \end{bmatrix} \begin{bmatrix} a_0 \\ a_1 \end{bmatrix} = \begin{bmatrix} Q^T \end{bmatrix} \begin{bmatrix} 3.15 \\ 2.979 \\ \vdots \\ 2.7663 \end{bmatrix}$$

Resolviendo:

$a_0 = 3.2708 \Rightarrow \ln(r) = 3.2708 \Rightarrow r = 26.33$

$a_1 = -0.0272 \Rightarrow a_1 = S \Rightarrow S = -0.0272$

Pregunta 6

$$y = 26.33\, e^{-0.0272x}$$

$$y(18) = 26.33\, e^{-0.027(18)}$$

$$y(18) = 16.136$$