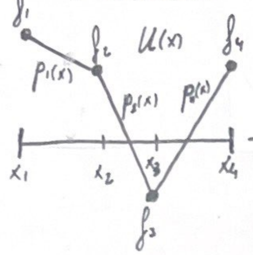
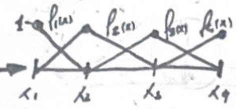
INTERPOLACIÓN POR TRAMOS

1º GRADO



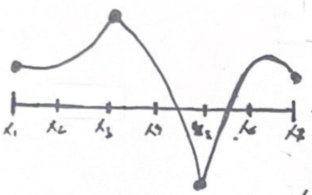


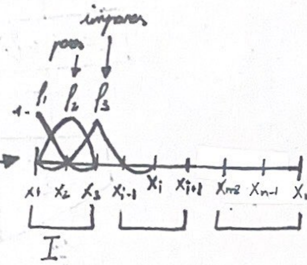
$$\varphi_1(x) = \begin{cases} \dfrac{x-x_2}{x_1-x_2}, & x \in [x_1, x_2] \\ 0, & x \in [x_2, x_4] \end{cases} \qquad \varphi_2 \begin{cases} 0, & x \in [x_3, x_4] \\ \dfrac{x-x_1}{x_2-x_1} & x \in [x_1, x_2] \\ \dfrac{x-x_3}{x_2-x_3} & x \in [x_2, x_3] \end{cases}$$

$$\varphi_3(x) = \begin{cases} 0 & x \in [x_1, x_2] \\ \dfrac{x-x_2}{x_3-x_2} & x \in [x_2, x_3] \\ \dfrac{x-x_4}{x_3-x_4} & x \in [x_3, x_4] \end{cases} \qquad \varphi_4(x) = \begin{cases} 0, & x \in [x_1, x_3] \\ \dfrac{x-x_3}{x_4-x_3} & x \in [x_3, x_4] \end{cases}$$

$$U(x) = \begin{cases} f_1 \cdot \varphi_1(x) + f_2\, \varphi_2(x); & x \in [x_1, x_2] \\ f_2 \cdot \varphi_2(x) + f_3 \varphi_3(x); & x \in [x_2, x_3] \\ f_3 \varphi_3(x) + f_4 \varphi_4(x); & x \in [x_3, x_4] \end{cases}$$

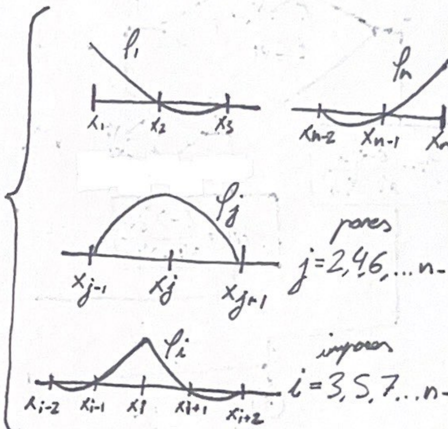
2º GRADO





Necesitamos nº impar de puntos

$$\text{Intervalos} = \frac{\text{nº puntos} - 1}{2}$$



pares $j = 2, 4, 6, \dots n-1$

impares $i = 3, 5, 7 \dots n-2$

$$\varphi_1(x) \begin{cases} \dfrac{(x-x_2)(x-x_3)}{(x_1-x_2)(x_1-x_3)} & x \in [x_1, x_3] \\ 0 & x \in [x_3, x_n] \end{cases} \qquad \varphi_2(x) \begin{cases} \dfrac{(x-x_1)(x-x_3)}{(x_2-x_1)(x_2-x_3)} & x \in [x_1, x_3] \\ 0 & x \in [x_3, x_n] \end{cases}$$

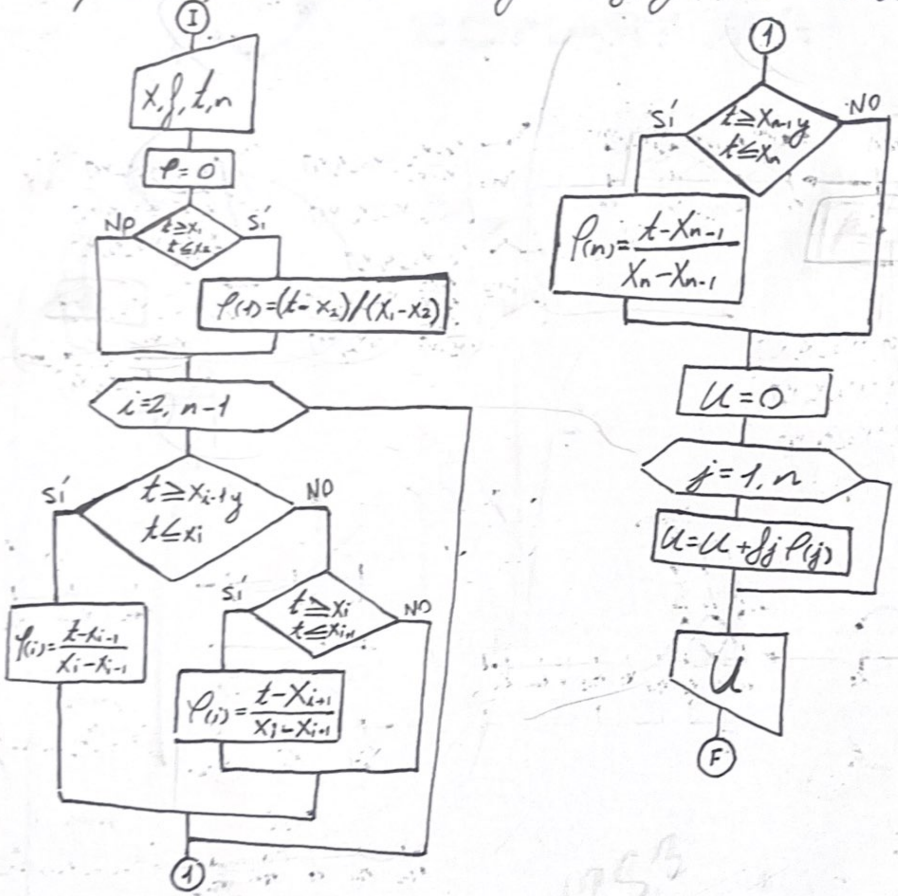
$$\varphi_3(x) \begin{cases} \dfrac{(x-x_1)(x-x_2)}{(x_3-x_1)(x_3-x_2)} & x \in [x_1, x_3] \\ \dfrac{(x-x_4)(x-x_5)}{(x_3-x_4)(x_3-x_5)} & x \in [x_3, x_5] \\ 0 & x \in [x_5, x_n] \end{cases}$$

$$\varphi_n(x) \begin{cases} \dfrac{(x-x_{n-1})(x-x_{n-2})}{(x_n-x_{n-1})(x_n-x_{n-2})} & x \in [x_{n-2}, x_n] \\ 0 & x \in [x_1, x_{n-2}] \end{cases}$$

ej.: $t \in [x_1, x_3]$:

$$p(t) = f_1 \cdot \varphi_1 + f_2 \cdot \varphi_2 + f_3 \varphi_3$$

Algoritmo 1er grado: nos dan un punto "t" sobre el que interpolar, un vector con los puntos de soporte "x", otro con los valores de la función "f" y "n", el número de puntos de soporte.



Algoritmo 2º grado: