

Nombre: Daniel Simbana

NRC: 2234

Fecha: 12-01-2022

Area # 6 Trazadores

Considera la siguiente tabla de datos para el agua, donde T es temperatura y ρ es densidad, hacer la representación del trazador cúbico y del polinomio interpolante ($P_4(x)$)

	x_0	x_1	x_2	x_3	x_4
$T (K)$	50	60	65	75	80
$\rho (kg/m^3)$	988	985.7	980.5	974.8	971.6

$$S(x) = \begin{cases} S_0(x) = a_0 + b_0(x-50) + c_0(x-50)^2 + d_0(x-50)^3 \\ S_1(x) = a_1 + b_1(x-60) + c_1(x-60)^2 + d_1(x-60)^3 \\ S_2(x) = a_2 + b_2(x-65) + c_2(x-65)^2 + d_2(x-65)^3 \\ S_3(x) = a_3 + b_3(x-75) + c_3(x-75)^2 + d_3(x-75)^3 \end{cases}$$

$$S_0(50) = 988 = a_0 \quad (1)$$

$$S_1(60) = 985.7 = a_1 \quad (2)$$

$$S_2(65) = 980.5 = a_2 \quad (3)$$

$$S_3(75) = 974.8 = a_3 \quad (4)$$

$$S_4(80) = 971$$

$$S_3(x_4) = 974$$

$$S_3(80) = 974.8 = a_3 + b_3(5) + c_3(5)^2 + d_3(5)^3$$

$$S_3(80) = 974.8 = a_3 + 5b_3 + 25c_3 + 125d_3$$

$$S_3(80) = -3.2 = 5b_3 + 25c_3 + 125d_3 \quad (5) //$$

$$j=0 \quad x_1 = 60$$

$$S_0(x_1) = S_1(x_1)$$

$$a_0 + b_0(10) + c_0(10)^2 + d_0(10)^3 = a_1$$

$$988 + 10b_0 + 100c_0 + 1000d_0 = 985.7$$

$$10b_0 + 100c_0 + 1000d_0 = -2.3 \quad (6)$$

$$j=1 \quad x_2 = 65$$

$$S_1(x_2) = S_2(x_2)$$

$$a_1 + b_1(5) + c_1(5)^2 + d_1(5)^3 = a_2$$

$$985.7 + 5b_1 + 25c_1 + 125d_1 = 980.5$$

$$5b_1 + 25c_1 + 125d_1 = -5.2 \quad (7)$$

$$i=2 \quad x_3 = 75$$

$$S_1(x_2) = S_3(x_2)$$

$$a_2 + b_2(75 - 65) + c_2(10)^2 + d_2(10)^3 = a_3$$

$$980.5 + 10b_2 + 100c_2 + 1000d_2 = 974.8$$

$$10b_2 + 100c_2 + 1000d_2 = -5.7 \quad (8)$$

- Derivadas

$$i=0 \quad x_1 = 60$$

$$b_0 + 2c_0(10) + 3d_0(10)^2 = b_1 \quad (9)$$

$$i=1 \quad x_2 = 65$$

$$b_1 + 2c_1(5) + 3d_1(5)^2 = b_2$$

$$b_1 - b_2 + 10c_1 + 75d_1 = 0 \quad (10)$$

$$i=2 \quad x_3 = 75$$

$$b_2 + 2c_2(10) + 3d_2(10)^2 = b_3$$

$$b_2 - b_3 + 20c_2 + 300d_2 = 0 \quad (11)$$

- Segunda Derivadas

$$i=0 \quad x_1 = 60$$

$$2c_0 + 6d_0(10) = 2c_1$$

$$2c_0 + 6d_0 - 2c_1 = 0$$

$$2c_0 + 30d_0 - c_1 = 0 \quad (12)$$

$$i=1 \quad x_2 = 65$$

$$2c_1 + 6d_1(5) = 2c_2$$

$$c_1 - c_2 + 15d_1 = 0 \quad (13)$$

$$i=2 \quad x_3 = 75$$

$$2c_2 + 6d_2(10) = 2c_3$$

$$c_2 + 30d_2 - c_3 = 0 \quad (14)$$

