

حل المثال 2.2 :

لدينا 3 نقاط إذن درجة كثير الحدود لا تترويح صي ≤ 2 .

$$P_2(x) = \sum_{i=0}^2 L_i(x) f(x_i) = L_0(x) f(x_0) + L_1(x) f(x_1) + L_2(x) f(x_2)$$

$$L_0(x) = \frac{(x-x_1)(x-x_2)}{(x_0-x_1)(x_0-x_2)} = \frac{(x-1)(x-2)}{(0-1)(0-2)} = \frac{1}{2}(x^2-3x+2)$$

$$L_1(x) = \frac{(x-x_0)(x-x_2)}{(x_1-x_0)(x_1-x_2)} = \frac{(x-0)(x-2)}{(1-0)(1-2)} = -x^2+2x$$

$$L_2(x) = \frac{(x-x_0)(x-x_1)}{(x_2-x_0)(x_2-x_1)} = \frac{(x-0)(x-1)}{(2-0)(2-1)} = \frac{1}{2}(x^2-x)$$

$$P_2(x) = \frac{1}{2}(x^2-3x+2)(-4) + (-x^2+2x)(2) + \frac{1}{2}(x^2-x)(2) \quad \text{أذن:}$$

$$P_2(x) = -2x^2+6x-4 -2x^2+4x + x^2-x = -3x^2+9x-4$$

$$P_2(x) = -3x^2+9x-4$$

حل المثال 2.2 :

لدينا 4 نقاط $\Rightarrow$ درجة كثير الحدود صي ≤ 3

$$P_3(x) = c_0 + c_1(x-x_0) + c_2(x-x_0)(x-x_1) + c_3(x-x_0)(x-x_1)(x-x_2)$$

نفس جدول من أجل حساب المعاملات:

الترتيب 3	الترتيب 2	الترتيب 1	x_i	$f(x_i)$
$\delta[f(x_0), f(x_1), f(x_2), f(x_3)] = c_3$ $= \frac{1-4}{3-0} = \frac{1}{6}$	$\delta[f(x_0), f(x_1), f(x_2)] = c_2$ $= \frac{4-3}{2-0} = \frac{1}{2}$	$\delta[f(x_0), f(x_1)] = c_1$ $= \frac{4-1}{1-0} = 3$	0	$x_0=0, f(x_0)=1$
	$\delta[f(x_1), f(x_2)] = 4$	$\delta[f(x_2), f(x_3)] = 6$	1	$x_1=1, f(x_1)=4$
	$\delta[f(x_0), f(x_2), f(x_3)] = 1$ $= \frac{6-4}{3-1}$		2	$x_2=2, f(x_2)=8$
			3	$x_3=3, f(x_3)=14$

$$P_3(x) = 1 + 3(x-0) + \frac{1}{2}(x-0)(x-1) + \frac{1}{6}(x-0)(x-1)(x-2) \quad \text{أذن:}$$

$$= 1 + 3x + \frac{1}{2}(x^2-x) + \frac{1}{6}x(x^2-3x+2) = \frac{1}{6}x^3 + \frac{1}{2}x^2 + \frac{1}{2}x + 1$$