6 (done)

8 November, 2023 15:14

mogą być obliczeniówki ale dobra metoda i wzory (szczególnie że wynik dziki)

L6.6. $\boxed{\text{1 punkt}}$ Podaj postać Lagrange'a wielomianu interpolacyjnego dla danych

	0	1	2	3
x_k	-10	-5	7	11
y_k	8	-3	5	0

0: $(8+3)(8-5)8 = 11\cdot 3\cdot 8 = 264$

1: $-11(-8)(-3) = -264$

2: $17\cdot 12\,(-4) = -816$

3: $21\cdot 16\cdot 4 = 1344$

Źle a i b

0: $(-10+5)(-10-7)(-10-11) = -1785$

1: $(-5+10)(-5-7)(-5-11) = 960$

2: $(7+10)(7+5)(7-11) = -816$

3: $(11+10)(11+5)(11-7) = 1344$

$$L_3(x) = y_0\lambda_0(x) + y_1\lambda_1(x) + y_2\lambda_2(x) + y_3\lambda_3(x)$$

$$\lambda_0 = \frac{x-x_1}{x_0-x_1}\cdot\frac{x-x_2}{x_0-x_2}\cdot\frac{x-x_3}{x_0-x_3} = (x+5)(x-7)(x-11)\cdot\frac{1}{264}\cdot y_0 = \frac{1}{33} \quad -\frac{8}{1785}$$

$$\lambda_1 = \frac{x-x_0}{x_1-x_0}\cdot\frac{x-x_2}{x_1-x_2}\cdot\frac{x-x_3}{x_1-x_3} = (x+10)(x-7)(x-11)\cdot\frac{1}{-264}\cdot y_1 = \frac{1}{88} \quad -\frac{1}{320}$$

$$\lambda_2 = \frac{x-x_0}{x_2-x_0}\cdot\frac{x-x_1}{x_2-x_1}\cdot\frac{x-x_3}{x_2-x_3} = (x+10)(x+5)(x-11)\cdot\frac{1}{-816}\cdot y_2 = -\frac{5}{816}$$

$$\lambda_3 = \frac{x-x_0}{x_3-x_0}\cdot\frac{x-x_1}{x_3-x_1}\cdot\frac{x-x_2}{x_3-x_2} = (x+10)(x+5)(x-7)\cdot\frac{1}{1344}\cdot y_3 = 0$$

$$L_3 = \cancel{\tfrac{1}{33}}\,{-\tfrac{8}{1785}}(x+5)(x-7)(x-11) + \cancel{\tfrac{1}{88}}\,{-\tfrac{1}{320}}(x+10)(x-7)(x-11) - \frac{5}{816}(x+10)(x+5)(x-11) + 0\cdot(x+10)(x+5)(x-7) =$$

$$\cancel{\frac{1}{33}x^3 - \frac{13}{33}x^2 - \frac{13}{33}x + \frac{35}{3} + \frac{1}{88}x^3 - \frac{1}{11}x^2 - \frac{103}{88}x + \frac{770}{88} - \frac{5}{816}x^3 - \frac{20}{816}x^2 + \frac{675}{816}x + \frac{2750}{816}} =$$

$$\cancel{\frac{29x^3}{816} - \frac{381x^2}{748} - \frac{7717x}{8976} + \frac{3235}{136}}$$

$$= -\frac{8}{1785}x^3 + \frac{104}{1785}x^2 + \frac{104}{1785}x - \frac{88}{51} - \frac{1}{320}x^3 + \frac{1}{40}x^2 + \frac{103}{320}x - \frac{77}{32} - \frac{5}{816}x^3 - \frac{20}{816}x^2 + \frac{275}{816}x + \frac{550}{816}$$

$$= -\frac{523}{38080}x^3 + \frac{839}{14280}x^2 + \frac{41309}{38080}x - \frac{1243}{1632}$$