

$$1) f(x) = \frac{x^2}{x+3}, \quad x_0=0, \quad x_1=1.5, \quad x_2=3$$

Sancho

Ibidze

task 3-6 on code.

$$1) f(x_0) = f(0) = 0$$

$$f(x_1) = f(1.5) = \frac{(1.5)^2}{1.5+3} = 0.5$$

$$f(x_2) = f(3) = 1.5$$

$$2) P_2(x) = \sum_{j=0}^2 f(x_j) L_j(x), \quad L_j(x) = \prod_{n \neq j} \frac{x - x_n}{x_j - x_n}$$

$$L_0(x) \text{ for } x_0=0.$$

$$L_0(x) = \frac{x - x_1}{x_0 - x_1} \cdot \frac{x - x_2}{x_0 - x_2} = \frac{x - 1.5}{-1.5} \cdot \frac{x - 3}{-3}$$

$$L_0(x) = \frac{(x - 1.5)(x - 3)}{4.5}$$

$$L_1(x) = 1.5$$

$$L_1(x) = \frac{x}{1.5} \cdot \frac{x - 3}{-1.5} = \frac{x(x - 3)}{-2.25}$$

$$L_2(x) = 3$$

$$L_2(x) = \frac{x}{3} \cdot \frac{x - 1.5}{1.5} = \frac{x(x - 1.5)}{4.5}$$

now  $P_2$

$$P_2 = \frac{2}{2} \cdot \frac{x(x - 3)}{-2.25} + \frac{3}{2} \cdot \frac{x(x - 1.5)}{4.5}$$

$$\text{First term: } \frac{1}{2} \cdot \frac{1}{-2.25} = -\frac{2}{9}$$

$$-\frac{2}{9}x(x - 3)$$

$$\text{Second term: } \frac{3}{2} \cdot \frac{2}{9} = \frac{1}{3}$$

$$\frac{1}{3}x(x - 1.5)$$



$$P_1(x) = \left(-\frac{2}{9} + \frac{1}{3}\right)x^2 + \left(\frac{2}{3} - \frac{1}{2}\right)x \Rightarrow P_2(x) = \frac{1}{9}x^2 + \frac{1}{6}x.$$

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task 3-6 on code.