

### Latihan Soal:

Diketahui data-data berikut:  $(0, -6); (2, 4); (4, 10)$ .

Tentukan persamaan dari  $f(1)$

Penyelesaian:

Interpolasi Newton Gregory Maju

x	f(x)	$\Delta f(x)$	$\Delta^2 f(x)$
0	-6	10	
2	4	6	-4
4	10		

$\triangleright f(x_0)$

$\triangleright \Delta f(x_0)$

$\triangleright \Delta^2 f(x_0)$

$$\begin{aligned} h &= 2 \\ s &= \frac{x - 0}{2} = \frac{x}{2} \end{aligned}$$

$$\begin{aligned} P_2(x) &= f(x_0) + \Delta f(x_0) \cdot s + \frac{\Delta^2 f(x_0)}{2!} \cdot s(s-1) \\ &= -6 + 10 \cdot \left(\frac{x}{2}\right) + \frac{4}{2} \left(\frac{x}{2}\right) \left(\left(\frac{x}{2}\right) - 1\right) \\ &= -6 + 5x - x \left(\left(\frac{x}{2}\right) - 1\right) \end{aligned}$$

$$\begin{aligned} f(1) &\approx P_2(1) = -6 + 5 \cdot 1 - 1 \cdot \left(\left(\frac{1}{2}\right) - 1\right) \\ &= -6 + 5 + \frac{1}{2} \end{aligned}$$

$$f(1) \approx P_2(1) = -0,5$$

### Interpolasi Newton Gregory Mundur

$x$	$f(x)$	$\nabla f(x)$	$\nabla^2 f(x)$
0	-6		
2	4	10	-4
4	10	6	

$$h = 2$$

$$s = \frac{x-4}{2}$$

$$\nabla^2 f(x_2)$$

$$\nabla f(x_2)$$

$$f(x_2)$$

$$P_2(x) = f(x_2) + \nabla f(x_2) \cdot s + \frac{\nabla^2 f(x_2)}{2!} \cdot s(s+1)$$

$$= 10 + 6 \left( \frac{x-4}{2} \right) - \frac{4}{2} \cdot \left( \frac{x-4}{2} \right) \left( \left( \frac{x-4}{2} \right) + 1 \right)$$

$$= 10 + 3(x-4) - (x-4) \left( \left( \frac{x-4}{2} \right) + 1 \right)$$

$$f(1) \approx P_2(1) = 10 + 3(1-4) - (1-4) \left( \left( \frac{1-4}{2} \right) + 1 \right)$$

$$= 10 - 9 - (-3) \left( -\frac{1}{2} + 1 \right)$$

$$= 10 - 9 - \frac{3}{2}$$

$$f(1) \approx P_2(1) = -0,5$$