

Ex.: (2) find IP through $(x_0, y_0) = (1, 2)$

$$(x_1, y_1) = (3, 5)$$

$$(x_2, y_2) = (4, 4)$$

↖ same as Ex.(1)

with LI.

Compute the LPs:

$$\begin{aligned} L_0^2(x) &= \frac{x-x_1}{x_0-x_1} \cdot \frac{x-x_2}{x_0-x_2} = \frac{x-3}{1-3} \cdot \frac{x-4}{1-4} \\ &= \frac{1}{6}(x-3)(x-4) \end{aligned}$$

$$\begin{aligned} L_1^2(x) &= \frac{x-x_0}{x_1-x_0} \cdot \frac{x-x_2}{x_1-x_2} = \frac{x-1}{3-1} \cdot \frac{x-4}{3-4} \\ &= -\frac{1}{2}(x-1)(x-4) \end{aligned}$$

$$\begin{aligned} L_2^2(x) &= \frac{x-x_0}{x_2-x_0} \cdot \frac{x-x_1}{x_2-x_1} = \frac{x-1}{4-1} \cdot \frac{x-3}{4-3} \\ &= \frac{1}{3}(x-1)(x-3) \end{aligned}$$

Now inserting into the LI

$$p_2(x) = 2 \cdot L_0^2(x) + 5 \cdot L_1^2(x) + 4 \cdot L_2^2(x)$$

$$= \dots = 2 + \frac{29}{6}x - \frac{5}{6}x^2$$

(like Ex.(1), indeed!)