

$$\begin{aligned} &> \{ 'a*x[i]^2 + b*x[i] + c = y[i]' \text{ \$ } i = 1..3 \} \\ &\quad \left\{ a x_1^2 + b x_1 + c = y_1, a x_2^2 + b x_2 + c = y_2, a x_3^2 + b x_3 + c = y_3 \right\} \end{aligned} \quad (1)$$

$$\begin{aligned} &> \text{COEFF} := \text{solve}(\%, \{a,b,c\}); \\ \text{COEFF} &:= \left\{ a = - \frac{x_1 y_2 - x_1 y_3 - x_2 y_1 + x_2 y_3 + x_3 y_1 - x_3 y_2}{x_1^2 x_2 - x_1^2 x_3 - x_1 x_2^2 + x_1 x_3^2 + x_2^2 x_3 - x_2 x_3^2}, b \right. \\ &= \frac{x_1^2 y_2 - x_1^2 y_3 - x_2^2 y_1 + x_2^2 y_3 + x_3^2 y_1 - x_3^2 y_2}{(x_1 - x_2) (x_1 x_2 - x_1 x_3 - x_2 x_3 + x_3^2)}, c \\ &= \left. \frac{x_1^2 x_2 y_3 - x_1^2 x_3 y_2 - x_1 x_2^2 y_3 + x_1 x_3^2 y_2 + x_2^2 x_3 y_1 - x_2 x_3^2 y_1}{(x_1 - x_2) (x_1 x_2 - x_1 x_3 - x_2 x_3 + x_3^2)} \right\} \end{aligned} \quad (2)$$

$$\begin{aligned} &> \text{diff}(a*x^2 + b*x + c, x) = 0; \text{solve}(\%, x); \\ &\quad 2 a x + b = 0 \\ &\quad - \frac{b}{2 a} \end{aligned} \quad (3)$$

$$\begin{aligned} &> \text{subs}(\text{COEFF}, \%); \\ &\quad \left(\left(x_1^2 y_2 - x_1^2 y_3 - x_2^2 y_1 + x_2^2 y_3 + x_3^2 y_1 - x_3^2 y_2 \right) \left(x_1^2 x_2 - x_1^2 x_3 - x_1 x_2^2 + x_1 x_3^2 + x_2^2 x_3 \right. \right. \\ &\quad \left. \left. - x_2 x_3^2 \right) \right) / \left(2 (x_1 - x_2) (x_1 x_2 - x_1 x_3 - x_2 x_3 + x_3^2) (x_1 y_2 - x_1 y_3 - x_2 y_1 \right. \\ &\quad \left. + x_2 y_3 + x_3 y_1 - x_3 y_2) \right) \end{aligned} \quad (4)$$

$$\begin{aligned} &> \text{simplify}(\%); \\ &\quad \frac{(y_2 - y_3) x_1^2 + (-y_1 + y_3) x_2^2 + x_3^2 (y_1 - y_2)}{(2 y_2 - 2 y_3) x_1 + (-2 y_1 + 2 y_3) x_2 + 2 x_3 (y_1 - y_2)} \end{aligned} \quad (5)$$