3

$$l_3(x) = \prod_{\substack{i=0 \\ i \neq 1}}^{3} \frac{x - x_i}{x_3 - x_i} = \frac{x - x_0}{x_3 - x_0} \frac{x - x_1}{x_3 - x_1} \frac{x - x_2}{x_3 - x_2} = \frac{x-0}{3-0} \frac{x-1}{3-1} \frac{x-2}{3-2}$$

$$= \frac{1}{6}\left(x^3 - 3x^2 + 2x\right)$$

$$P_3(x) = e^0\left(-\frac{1}{6}\left(x^3 - 6x^2 + 12x - 6\right)\right) + \cdots$$

$$\cdots + e^1\left(\frac{1}{2}\left(x^3 - 5x^2 + 6x\right)\right) + \cdots$$

$$\cdots - e^2\left(\frac{1}{2}\left(x^3 - 4x^2 + 3x\right)\right)$$

$$\approx \left[-\frac{1}{6}x^3 + x^2 - 2x + 1\right] + 1.359\left(x^3 - 5x^2 + 6x\right) + \cdots$$

$$\cdots - 3.695\left(x^3 - 4x^2 + 3x\right)$$