

$$S_i''(x) = a_i \frac{x_{i+1} - x}{h} + a_{i+1} \frac{x - x_i}{h}$$

$$S_i''(x_i) = a_i = S_{i+1}''(x_i)$$

$$a_{i+1} - 4a_i + a_{i+1} = \frac{6}{h^2}(f_{i+1} - 2f_i + f_{i+1})$$

$$S_i(x) = \frac{a_i}{6h}(x_{i+1} - x)^3 + \frac{a_{i+1}}{6h}(x - x_i)^3 + b_i(x_{i+1} - x) + c_i(x - x_i)$$

$$\text{IF } n=1, h=\frac{1}{2},$$

$$S_0(x) = \frac{a_0}{3}(x_1 - x)^3 + \frac{a_1}{3}(x - x_0)^3 + b_0(x_1 - x) + c_0(x - x_0)$$

$$S_1(x) = \frac{a_1}{3}(x_2 - x)^3 + \frac{a_2}{3}(x - x_1)^3 + b_1(x_2 - x) + c_1(x - x_1)$$

$$\text{IF } x_0 = 0, x_1 = \frac{1}{2}, x_2 = 1;$$

$$S_0(x) = \frac{a_0}{3}(\frac{1}{2} - x)^3 + \frac{a_1}{3}x^3 + b_0(\frac{1}{2} - x) + c_0x$$

$$S_1(x) = \frac{a_1}{3}(1 - x)^3 + \frac{a_2}{3}(x - \frac{1}{2})^3 + b_1(x - \frac{1}{2}) + c_1(x - \frac{1}{2})$$

$$a_0 - 4a_1 + a_2 = 24(f_0 - 2f_1 + f_2)$$

$$\text{IF } f_0 = 0, f_1 = 1, f_2 = 0;$$

$$a_0 - 4a_1 + a_2 = 24(-2) = -48$$

$$i = 0, 1, \dots, n$$