

(c) It is known that the fifth divided difference is expressible in terms of the fifth derivative of f :

$$f[0, 1, 1, 1, 2, 2] = \frac{f^{(5)}(\xi)}{5!}$$

where $0 < \xi < 2$. Determine ξ .

Solution: Since $f[0, 1, 1, 1, 2, 2] = 30$ and

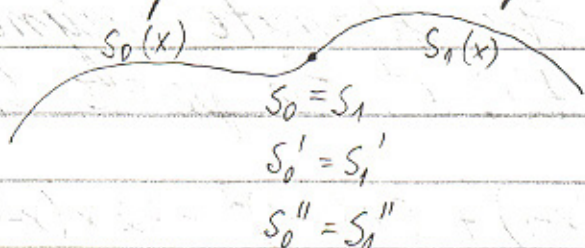
$$f^{(5)}(\xi) = 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot \xi^2$$

we have

$$30 = \frac{7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot \xi^2}{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1} = 21 \xi^2$$

$$30 = 21 \xi^2 \Rightarrow \xi^2 = \frac{30}{21} \quad \xi = \sqrt{\frac{30}{21}}$$

7) Cubic spline interpolation



clamped

$$S_0'(a) = f'(a)$$

$$S_1'(b) = f'(b)$$

natural

$$S_0''(a) = 0$$

$$S_1''(b) = 0$$