

$$\int_{-1}^1 f(x) dx = \int_{-1}^1 F(\xi) d\xi$$

$$x = \frac{b+a}{2} + \frac{b-a}{2} \xi$$

$$dx = \frac{b-a}{2} d\xi$$

$$F(\xi) = \frac{b-a}{2} f\left(\frac{b+a}{2} + \frac{b-a}{2} \xi\right)$$

$$\int_{-1}^1 F(\xi) d\xi \approx \sum_{i=1}^n F(\xi_i) w_i$$

$$w = \text{loss} \quad \xi_i / w_i$$

$$2 \quad \begin{array}{l} -0.57735 \\ 0.57735 \end{array}$$

$$4 \quad \begin{array}{l} -0.866115 \\ -0.866115 \end{array}$$

$$\begin{array}{l} 0.14785 \\ 0.14785 \end{array}$$

$$\text{nd} \quad \int_1^5 (x^2 + 2) dx =$$

$$x = \frac{b+a}{2} + \frac{b-a}{2} \xi \Rightarrow x = \frac{5+1}{2} + \frac{5-1}{2} \xi =$$

$$= 3 + 2\xi$$

$$dx = \frac{b-a}{2} d\xi \Rightarrow dx = \frac{5-1}{2} d\xi = 2d\xi$$

$$\int_1^5 ((3+2\xi)^2 + 2) d\xi = \int_{-1}^1 (8\xi^2 + 2\xi + 2) d\xi$$

$$F(\xi) = 8\xi^2 + 2\xi + 2$$

$$\sum_{i=1}^n F(\xi_i) w_i = F(\xi_1) w_1 + F(\xi_2) w_2 =$$

$$= (8 \cdot \xi_1^2 + 2\xi_1 + 2) w_1 + (8 \cdot \xi_2^2 + 2\xi_2 + 2) w_2$$

$$= 40.3338$$