

$$I_F = \frac{4h}{3} (2F(\bar{x} - h) - F(\bar{x}) + 2F(\bar{x} + h))$$

$$I_F = \frac{4h}{3} \left(2 \left(F(\bar{x}) - F'(\bar{x})(h) + \frac{1}{2!} F''(\bar{x})(h)^2 - \frac{1}{3!} F'''(\bar{x})(h)^3 + \frac{1}{4!} F^{(4)}(\bar{x})(h)^4 + \dots \right) - F(\bar{x}) + 2 \left(F(\bar{x}) + F'(\bar{x})(h) + \frac{1}{2!} F''(\bar{x})(h)^2 + \frac{1}{3!} F'''(\bar{x})(h)^3 + \frac{1}{4!} F^{(4)}(\bar{x})(h)^4 + \dots \right) \right)$$

$$= \frac{4h}{3} \left(3F(\bar{x}) + \frac{4}{2!} F''(\bar{x})(h)^2 + \frac{4}{4!} F^{(4)}(\bar{x})(h)^4 + \dots \right)$$

$$I_e = \int_a^b F(x) dx = h \int_{-2}^2 F(\bar{x} + \xi h) d\xi$$

$$= h \left(\int_{-2}^2 F(\bar{x}) d\xi + \int_{-2}^2 F'(\bar{x})(\xi h) d\xi + \int_{-2}^2 \frac{1}{2!} F''(\bar{x})(\xi h)^2 d\xi + \int_{-2}^2 \frac{1}{3!} F'''(\bar{x})(\xi h)^3 d\xi + \int_{-2}^2 \frac{1}{4!} F^{(4)}(\bar{x})(\xi h)^4 d\xi + \dots \right)$$

$$= h \left(4F(\bar{x}) + \frac{(h)^2}{2!} F''(\bar{x}) \frac{16}{3} + \frac{(h)^4}{4!} F^{(4)}(\bar{x}) \frac{64}{5} + \dots \right)$$

$$E_a = I_e - I_F = h \left(4F(\bar{x}) + \frac{(h)^2}{2!} F''(\bar{x}) \frac{16}{3} + \frac{(h)^4}{4!} F^{(4)}(\bar{x}) \frac{64}{5} + \dots \right) - \frac{4h}{3} \left(3F(\bar{x}) + \frac{4}{2!} F''(\bar{x})(h)^2 + \frac{4}{4!} F^{(4)}(\bar{x})(h)^4 + \dots \right)$$

Rotendo-se apenas ao termo dominante:

$$E_a = \frac{64}{5} F^{(4)}(\bar{x})(h)^5 \frac{1}{4!} - \frac{4}{3} F^{(4)}(\bar{x})(h)^5 \frac{4}{4!}$$

$$= \frac{1}{4!} F^{(4)}(\bar{x})(h)^5 \left(\frac{64}{5} - \frac{4 \cdot 4}{3} \right) = \frac{112}{15 \cdot 3 \cdot 8} F^{(4)}(\bar{x})(h)^5 =$$

$$= \frac{14}{45} h^5 F^{(4)}(\bar{x}) //$$