

Calcolo condizioni coeff. metodi multistep

> restart;

> MSTEP := sum(alpha[j]*y(x[k]-j*h)-h*beta[j]*D(y)(x[k]-j*h), j=-1..L);

$$MSTEP := \sum_{j=-1}^L (\alpha_j y(-hj + x_k) - h \beta_j D(y)(-hj + x_k)) \quad (1)$$

> T := convert(taylor(MSTEP, h=0, 6), polynom);

$$T := \sum_{j=-1}^L \alpha_j y(x_k) + \left(\sum_{j=-1}^L (-\alpha_j D(y)(x_k)j - \beta_j D(y)(x_k)) \right) h + \left(\sum_{j=-1}^L \left(\frac{1}{2} \alpha_j D^{(2)}(y)(x_k)j^2 + \beta_j D^{(2)}(y)(x_k)j \right) \right) h^2 + \left(\sum_{j=-1}^L \left(-\frac{1}{6} \alpha_j D^{(3)}(y)(x_k)j^3 - \frac{1}{2} \beta_j D^{(3)}(y)(x_k)j^2 \right) \right) h^3 + \left(\sum_{j=-1}^L \left(\frac{1}{24} \alpha_j D^{(4)}(y)(x_k)j^4 + \frac{1}{6} \beta_j D^{(4)}(y)(x_k)j^3 \right) \right) h^4 + \left(\sum_{j=-1}^L \left(-\frac{1}{120} \alpha_j D^{(5)}(y)(x_k)j^5 - \frac{1}{24} \beta_j D^{(5)}(y)(x_k)j^4 \right) \right) h^5 \quad (2)$$

Calcolo termine A0

> subs(D(y)(x[k])=0,
D(D(y))(x[k])=0,
D(D(D(y)))(x[k])=0,
D(D(D(D(y)))(x[k])=0,
D(D(D(D(D(y)))(x[k])=0,
y(x[k])=1,
T) : simplify(%) ;

$$\sum_{j=-1}^L \alpha_j \quad (3)$$

Calcolo termine A1

> subs(y(x[k])=0,
D(y)(x[k])=1,
D(D(y))(x[k])=0,
D(D(D(y)))(x[k])=0,
D(D(D(D(y)))(x[k])=0,
D(D(D(D(D(y)))(x[k])=0, T) : simplify(%) ;

$$-\left(\sum_{j=-1}^L (j \alpha_j + \beta_j) \right) h \quad (4)$$

Calcolo termine A2

> subs(y(x[k])=0,
D(y)(x[k])=0,
D(D(y))(x[k])=1,

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D(D(D(y)))(x[k])=0,
D(D(D(D(y))))(x[k])=0,
D(D(D(D(D(y)))))(x[k])=0,T) : simplify(%) ;

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$$\frac{1}{2} \left(\sum_{j=-1}^L (j^2 \alpha_j + 2j \beta_j) \right) h^2 \quad (5)$$

Calcolo termine A3

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> subs( y(x[k])=0,
        D(y)(x[k])=0,
        D(D(y))(x[k])=0,
        D(D(D(y)))(x[k])=1,
        D(D(D(D(y))))(x[k])=0,
        D(D(D(D(D(y)))))(x[k])=0,T) : simplify(%) ;

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$$-\frac{1}{6} \left(\sum_{j=-1}^L (j^3 \alpha_j + 3j^2 \beta_j) \right) h^3 \quad (6)$$

Calcolo termine A4

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> subs( y(x[k])=0,
        D(y)(x[k])=0,
        D(D(y))(x[k])=0,
        D(D(D(y)))(x[k])=0,
        D(D(D(D(y))))(x[k])=1,
        D(D(D(D(D(y)))))(x[k])=0,T) : simplify(%) ;

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$$\frac{1}{24} \left(\sum_{j=-1}^L (j^4 \alpha_j + 4j^3 \beta_j) \right) h^4 \quad (7)$$

Calcolo termine A5

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> subs( y(x[k])=0,
        D(y)(x[k])=0,
        D(D(y))(x[k])=0,
        D(D(D(y)))(x[k])=0,
        D(D(D(D(y))))(x[k])=0,
        D(D(D(D(D(y)))))(x[k])=1,T) : simplify(%) ;

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$$-\frac{1}{120} \left(\sum_{j=-1}^L (j^5 \alpha_j + 5j^4 \beta_j) \right) h^5 \quad (8)$$