Vzorce ke zkoušce z numerické matematiky

$$p_{n+1} = p_n - \frac{f(p_n)(p_n - p_{n-1})}{f(p_n) - f(p_{n-1})}$$

$$p_{n+1} = a_n - \frac{f(a_n)(b_n - a_n)}{f(b_n) - f(a_n)}$$

$$p_{n+1} = p_n - \frac{f(p_n)}{f'(p_n)}$$

$$\begin{aligned}
L_0(x) &= \frac{(x-x_1)(x-x_2)(x-x_3)\cdots(x-x_n)}{(x_0-x_1)(x_0-x_2)(x_0-x_3)\cdots(x_0-x_n)}\\
L_1(x) &= \frac{(x-x_0)(x-x_2)(x-x_3)\cdots(x-x_n)}{(x_1-x_0)(x_1-x_2)(x_1-x_3)\cdots(x_1-x_n)}\\
L_2(x) &= \frac{(x-x_0)(x-x_1)(x-x_3)\cdots(x-x_n)}{(x_2-x_0)(x_2-x_1)(x_2-x_3)\cdots(x_2-x_n)}\\
&\cdots\\
L_n(x) &= \frac{(x-x_0)(x-x_1)(x-x_3)\cdots(x-x_{n-1})}{(x_n-x_0)(x_n-x_1)(x_n-x_3)\cdots(x_n-x_{n-1})}
\end{aligned}$$

$$P_n(x) = L_0(x)f(x_0) + L_1(x)f(x_1) + L_2(x)f(x_2) + \cdots + L_n(x)f(x_n)$$

$$P_{0,1,\ldots,k}(x) = \frac{(x-x_j)P_{0,1,\ldots,j-1,j+1,\ldots,k}(x) - (x-x_i)P_{0,1,\ldots,i-1,i+1,\ldots,k}(x)}{x_i - x_j}$$

$$\begin{array}{cccccc}
x_0 & P_0 = f(x_0) & & & & \\
x_1 & P_1 = f(x_1) & P_{0,1} & & & \\
x_2 & P_2 = f(x_2) & P_{1,2} & P_{0,1,2} & & \\
x_3 & P_3 = f(x_3) & P_{2,3} & P_{1,2,3} & P_{0,1,2,3} & \\
x_4 & P_4 = f(x_4) & P_{3,4} & P_{2,3,4} & P_{1,2,3,4} & P_{0,1,2,3,4}\\
\vdots & \vdots & \vdots & \vdots & \vdots & \ddots
\end{array}$$

$$\int_a^b f(x)dx \approx f\left(\frac{a+b}{2}\right)(b-a)$$

$$\int_a^b f(x)dx \approx (b-a)\frac{f(a)+f(b)}{2}$$

$$\int_a^b f(x)dx \approx \frac{(b-a)}{6}\left[f(a) + 4f\left(\frac{a+b}{2}\right) + f(b)\right]$$

$$\int_a^b f(x)dx = 2h\sum_{j=0}^{n/2} f(x_{2j}) + \frac{h^2(b-a)}{6}f^{(2)}(\xi), \qquad h = (b-a)/n, x_j = a + jh$$

$$\int_a^b f(x)dx = \frac{h}{2}\left[f(a) + 2\sum_{j=1}^{(n-1} f(x_j) + f(b)\right] - \frac{h^2(b-a)}{12}f^{(2)}(\xi)$$

$$\int_a^b f(x)dx = \frac{h}{3}\left[f(a) + 2\sum_{j=1}^{(n/2)-1} f(x_{2j}) + 4\sum_{j=1}^{n/2} f(x_{2j-1}) + f(b)\right] - \frac{h^4(b-a)}{180}f^{(4)}(\xi)$$

$$x_i^{(k)} = (1-\omega)x_i^{(k-1)} + \frac{\omega}{a_{ii}}\left[b_i - \sum_{j=1}^{i-1} a_{ij}x_j^{(k)} - \sum_{j=i+1}^{n} a_{ij}x_j^{(k-1)}\right],$$