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$$s(x)=M_{k-1}\frac{\left(x_k-x\right)^3}{6h_k}+M_k\frac{\left(x-x_{k-1}\right)^3}{6h_k}+C_1x+C_2$$

$$y_k=M_{k-1}\frac{\left(x_k-x_k\right)^3}{6h_k}+M_k\frac{\left(x_k-x_{k-1}\right)^3}{6h_k}+C_1x_k+C_2$$

$$y_{k-1}=M_{k-1}\frac{\left(x_k-x_{k-1}\right)^3}{6h_k}+M_k\frac{\left(x_{k-1}-x_{k-1}\right)^3}{6h_k}+C_1x_{k-1}+C_2$$

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$$y_k=M_k\frac{\left(x_k-x_{k-1}\right)^3}{6h_k}+C_1x_k+C_2$$

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$$y_k=M_k\frac{h_k^3}{6h_k}+C_1x_k+C_2$$

$$y_{k-1}=M_{k-1}\frac{h_k^3}{6h_k}+C_1x_{k-1}+C_2$$

---

$$s''(x) = M_{k-1}\frac{x_k - x}{h_k} + M_k\frac{x - x_{k-1}}{h_k}$$

$$s'(x) = -M_{k-1}\frac{(x_k - x)^2}{2h_k} + M_k\frac{(x - x_{k-1})^2}{2h_k} + C_1$$

$$s(x) = M_{k-1}\frac{(x_k - x)^3}{6h_k} + M_k\frac{(x - x_{k-1})^3}{6h_k} + C_1 x + C_2$$

$$y_k = M_{k-1}\frac{(x_k - x_k)^3}{6h_k} + M_k\frac{(x_k - x_{k-1})^3}{6h_k} + C_1 x_k + C_2$$

$$y_{k-1} = M_{k-1}\frac{(x_k - x_{k-1})^3}{6h_k} + M_k\frac{(x_{k-1} - x_{k-1})^3}{6h_k} + C_1 x_{k-1} + C_2$$

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$$y_k = M_k\frac{(x_k - x_{k-1})^3}{6h_k} + C_1 x_k + C_2$$

$$y_{k-1} = M_{k-1}\frac{(x_k - x_{k-1})^3}{6h_k} + C_1 x_{k-1} + C_2$$

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$$\left.\begin{aligned} y_k &= M_k\frac{h_k^3}{6h_k} + C_1 x_k + C_2 \\ y_{k-1} &= M_{k-1}\frac{h_k^3}{6h_k} + C_1 x_{k-1} + C_2 \end{aligned}\right\} \Rightarrow \left\{\begin{aligned} C_1 x_k + C_2 &= y_k - \frac{h_k^3}{6}\cdot M_k \\ C_1 x_{k-1} + C_2 &= y_{k-1} - \frac{h_k^3}{6}\cdot M_{k-1} \end{aligned}\right.$$

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$$s''(x) = M_{k-1}\frac{x_k - x}{h_k} + M_k\frac{x - x_{k-1}}{h_k}$$

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$$y_k = M_{k-1}\frac{(x_k - x_k)^3}{6h_k} + M_k\frac{(x_k - x_{k-1})^3}{6h_k} + C_1x_k + C_2$$

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$$\left.\begin{aligned} y_k &= M_k\frac{h_k^3}{6h_k} + C_1x_k + C_2 \\ y_{k-1} &= M_{k-1}\frac{h_k^3}{6h_k} + C_1x_{k-1} + C_2 \end{aligned}\right\} \Rightarrow \left\{\begin{aligned} C_1x_k + C_2 &= y_k - \frac{h_k^3}{6}\cdot M_k \\ C_1x_{k-1} + C_2 &= y_{k-1} - \frac{h_k^3}{6}\cdot M_{k-1} \end{aligned}\right\} \Rightarrow \left\{\begin{aligned} C_1 &= \frac{y_k - y_{k-1}}{h_k} - \frac{M_k - M_{k-1}}{6}h_k \\ C_2 &= \left(y_{k-1} - \frac{1}{6}M_{k-1}h_k^2\right)\frac{x_k}{h_k} - \left(y_k - \frac{1}{6}M_kh_k^2\right)\frac{x_{k-1}}{h_k} \end{aligned}\right.$$

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$$s''(x) = M_{k-1}\frac{x_k - x}{h_k} + M_k\frac{x - x_{k-1}}{h_k}$$

$$s'(x) = -M_{k-1}\frac{(x_k - x)^2}{2h_k} + M_k\frac{(x - x_{k-1})^2}{2h_k} + C_1$$

$$s(x) = M_{k-1}\frac{(x_k - x)^3}{6h_k} + M_k\frac{(x - x_{k-1})^3}{6h_k} + C_1 x + C_2$$

$$y_k = M_{k-1}\frac{(x_k - x_k)^3}{6h_k} + M_k\frac{(x_k - x_{k-1})^3}{6h_k} + C_1 x_k + C_2$$

$$y_{k-1} = M_{k-1}\frac{(x_k - x_{k-1})^3}{6h_k} + M_k\frac{(x_{k-1} - x_{k-1})^3}{6h_k} + C_1 x_{k-1} + C_2$$

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$$y_k = M_k\frac{(x_k - x_{k-1})^3}{6h_k} + C_1 x_k + C_2$$

$$y_{k-1} = M_{k-1}\frac{(x_k - x_{k-1})^3}{6h_k} + C_1 x_{k-1} + C_2$$

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$$\left.\begin{aligned} y_k &= M_k\frac{h_k^3}{6h_k} + C_1 x_k + C_2 \\ y_{k-1} &= M_{k-1}\frac{h_k^3}{6h_k} + C_1 x_{k-1} + C_2 \end{aligned}\right\} \Rightarrow \left\{\begin{aligned} C_1 x_k + C_2 &= y_k - \frac{h_k^3}{6}\cdot M_k \\ C_1 x_{k-1} + C_2 &= y_{k-1} - \frac{h_k^3}{6}\cdot M_{k-1} \end{aligned}\right\} \Rightarrow \left\{\begin{aligned} C_1 &= \frac{y_k - y_{k-1}}{h_k} - \frac{M_k - M_{k-1}}{6}h_k \\ C_2 &= \left(y_{k-1} - \frac{1}{6}M_{k-1}h_k^2\right)\frac{x_k}{h_k} - \left(y_k - \frac{1}{6}M_k h_k^2\right)\frac{x_{k-1}}{h_k} \end{aligned}\right.$$

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$$s''(x)=M_{k-1}\frac{x_k-x}{h_k}+M_k\frac{x-x_{k-1}}{h_k}$$

$$s'(x)=-M_{k-1}\frac{(x_k-x)^2}{2h_k}+M_k\frac{(x-x_{k-1})^2}{2h_k}+\frac{y_k-y_{k-1}}{h_k}-\frac{M_k-M_{k-1}}{6}h_k$$

$$s(x)=M_{k-1}\frac{(x_k-x)^3}{6h_k}+M_k\frac{(x-x_{k-1})^3}{6h_k}+\left(\frac{y_k-y_{k-1}}{h_k}-\frac{M_k-M_{k-1}}{6}h_k\right)x+C_2$$

$$y_k=M_{k-1}\frac{(x_k-x_k)^3}{6h_k}+M_k\frac{(x_k-x_{k-1})^3}{6h_k}+C_1x_k+C_2$$

$$y_{k-1}=M_{k-1}\frac{(x_k-x_{k-1})^3}{6h_k}+M_k\frac{(x_{k-1}-x_{k-1})^3}{6h_k}+C_1x_{k-1}+C_2$$

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$$y_k=M_k\frac{(x_k-x_{k-1})^3}{6h_k}+C_1x_k+C_2$$

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$$\left.\begin{aligned}y_k&=M_k\frac{h_k^3}{6h_k}+C_1x_k+C_2\\y_{k-1}&=M_{k-1}\frac{h_k^3}{6h_k}+C_1x_{k-1}+C_2\end{aligned}\right\}\Rightarrow\left\{\begin{aligned}C_1x_k+C_2&=y_k-\frac{h_k^3}{6}\cdot M_k\\C_1x_{k-1}+C_2&=y_{k-1}-\frac{h_k^3}{6}\cdot M_{k-1}\end{aligned}\right\}\Rightarrow\left\{\begin{aligned}C_1&=\frac{y_k-y_{k-1}}{h_k}-\frac{M_k-M_{k-1}}{6}h_k\\C_2&=\left(y_{k-1}-\frac{1}{6}M_{k-1}h_k^2\right)\frac{x_k}{h_k}-\left(y_k-\frac{1}{6}M_kh_k^2\right)\frac{x_{k-1}}{h_k}\end{aligned}\right.$$

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$$s''(x)=M_{k-1}\frac{x_k-x}{h_k}+M_k\frac{x-x_{k-1}}{h_k}$$

$$s'(x)=-M_{k-1}\frac{(x_k-x)^2}{2h_k}+M_k\frac{(x-x_{k-1})^2}{2h_k}+\frac{y_k-y_{k-1}}{h_k}-\frac{M_k-M_{k-1}}{6}h_k$$

$$s(x)=M_{k-1}\frac{(x_k-x)^3}{6h_k}+M_k\frac{(x-x_{k-1})^3}{6h_k}+\left(\frac{y_k-y_{k-1}}{h_k}-\frac{M_k-M_{k-1}}{6}h_k\right)x+\left(y_{k-1}-\frac{1}{6}M_{k-1}h_k^2\right)\frac{x_k}{h_k}-\left(y_k-\frac{1}{6}M_kh_k^2\right)\frac{x_{k-1}}{h_k}$$


$$s''(x)=M_{k-1}\frac{x_k-x}{h_k}+M_k\frac{x-x_{k-1}}{h_k}$$

$$s'(x)=-M_{k-1}\frac{(x_k-x)^2}{2h_k}+M_k\frac{(x-x_{k-1})^2}{2h_k}+\frac{y_k-y_{k-1}}{h_k}-\frac{M_k-M_{k-1}}{6}h_k$$

$$s(x)=M_{k-1}\frac{(x_k-x)^3}{6h_k}+M_k\frac{(x-x_{k-1})^3}{6h_k}+\left(\frac{y_k-y_{k-1}}{h_k}-\frac{M_k-M_{k-1}}{6}h_k\right)x+\left(y_{k-1}-\frac{1}{6}M_{k-1}h_k^2\right)\frac{x_k}{h_k}-\left(y_k-\frac{1}{6}M_kh_k^2\right)\frac{x_{k-1}}{h_k}$$

$$s''(x) = M_{k-1}\frac{x_k - x}{h_k} + M_k\frac{x - x_{k-1}}{h_k}$$

$$s'(x) = -M_{k-1}\frac{\left(x_k - x\right)^2}{2h_k} + M_k\frac{\left(x - x_{k-1}\right)^2}{2h_k} + \frac{y_k - y_{k-1}}{h_k} - \frac{M_k - M_{k-1}}{6}h_k$$

$$s(x) = M_{k-1}\frac{\left(x_k - x\right)^3}{6h_k} + M_k\frac{\left(x - x_{k-1}\right)^3}{6h_k} + \left(\frac{y_k - y_{k-1}}{h_k} - \frac{M_k - M_{k-1}}{6}h_k\right)x + \left(y_{k-1} - \frac{1}{6}M_{k-1}h_k^2\right)\frac{x_k}{h_k} - \left(y_k - \frac{1}{6}M_k h_k^2\right)\frac{x_{k-1}}{h_k}$$

$$\lim_{x\to x_k} s''(x) = M_k \qquad \lim_{x\to x_k} s(x) = y_k$$

$$s''(x) = M_{k-1}\frac{x_k - x}{h_k} + M_k\frac{x - x_{k-1}}{h_k}$$

$$s'(x) = -M_{k-1}\frac{(x_k - x)^2}{2h_k} + M_k\frac{(x - x_{k-1})^2}{2h_k} + \frac{y_k - y_{k-1}}{h_k} - \frac{M_k - M_{k-1}}{6}h_k$$

$$s(x) = M_{k-1}\frac{(x_k - x)^3}{6h_k} + M_k\frac{(x - x_{k-1})^3}{6h_k} + \left(\frac{y_k - y_{k-1}}{h_k} - \frac{M_k - M_{k-1}}{6}h_k\right)x + \left(y_{k-1} - \frac{1}{6}M_{k-1}h_k^2\right)\frac{x_k}{h_k} - \left(y_k - \frac{1}{6}M_k h_k^2\right)\frac{x_{k-1}}{h_k}$$

$$\lim_{x\to x_k} s''(x) = M_k \qquad \lim_{x\to x_k} s(x) = y_k$$

$$\lim_{x\to x_k-} s'(x) = \frac{1}{6}h_k M_{k-1} + \frac{1}{3}h_k M_k + \frac{y_k - y_{k-1}}{h_k}$$

$$\lim_{x\to x_k+} s'(x) = -\frac{1}{3}h_{k+1}M_k - \frac{1}{6}h_{k+1}M_{k+1} + \frac{y_{k+1} - y_k}{h_{k+1}}$$

$$s''(x)=M_{k-1}\frac{x_k-x}{h_k}+M_k\frac{x-x_{k-1}}{h_k}$$

$$s'(x)=-M_{k-1}\frac{(x_k-x)^2}{2h_k}+M_k\frac{(x-x_{k-1})^2}{2h_k}+\frac{y_k-y_{k-1}}{h_k}-\frac{M_k-M_{k-1}}{6}h_k$$

$$s(x)=M_{k-1}\frac{(x_k-x)^3}{6h_k}+M_k\frac{(x-x_{k-1})^3}{6h_k}+\left(\frac{y_k-y_{k-1}}{h_k}-\frac{M_k-M_{k-1}}{6}h_k\right)x+\left(y_{k-1}-\frac{1}{6}M_{k-1}h_k^2\right)\frac{x_k}{h_k}-\left(y_k-\frac{1}{6}M_kh_k^2\right)\frac{x_{k-1}}{h_k}$$

$$\lim_{x\to x_k}s''(x)=M_k \qquad \lim_{x\to x_k}s(x)=y_k$$

$$\lim_{x\to x_k-}s'(x)=\frac{1}{6}h_kM_{k-1}+\frac{1}{3}h_kM_k+\frac{y_k-y_{k-1}}{h_k}$$

$$\lim_{x\to x_k+}s'(x)=-\frac{1}{3}h_{k+1}M_k-\frac{1}{6}h_{k+1}M_{k+1}+\frac{y_{k+1}-y_k}{h_{k+1}}$$

$$s''(x)=M_{k-1}\frac{x_k-x}{h_k}+M_k\frac{x-x_{k-1}}{h_k}$$

$$s'(x)=-M_{k-1}\frac{(x_k-x)^2}{2h_k}+M_k\frac{(x-x_{k-1})^2}{2h_k}+\frac{y_k-y_{k-1}}{h_k}-\frac{M_k-M_{k-1}}{6}h_k$$

$$s(x)=M_{k-1}\frac{(x_k-x)^3}{6h_k}+M_k\frac{(x-x_{k-1})^3}{6h_k}+\left(\frac{y_k-y_{k-1}}{h_k}-\frac{M_k-M_{k-1}}{6}h_k\right)x+\left(y_{k-1}-\frac{1}{6}M_{k-1}h_k^2\right)\frac{x_k}{h_k}-\left(y_k-\frac{1}{6}M_kh_k^2\right)\frac{x_{k-1}}{h_k}$$

$$\lim_{x\to x_k}s''(x)=M_k \qquad \lim_{x\to x_k}s(x)=y_k$$

$$\lim_{x\to x_k-}s'(x)=\frac{1}{6}h_kM_{k-1}+\frac{1}{3}h_kM_k+\frac{y_k-y_{k-1}}{h_k}$$

$$\lim_{x\to x_k+}s'(x)=-\frac{1}{3}h_{k+1}M_k-\frac{1}{6}h_{k+1}M_{k+1}+\frac{y_{k+1}-y_k}{h_{k+1}}$$

$$\lim_{x\to x_k-}s'(x)=\lim_{x\to x_k+}s'(x)$$

$$\lim_{x \to x_k -} s'(x) = \frac{1}{6} h_k M_{k-1} + \frac{1}{3} h_k M_k + \frac{y_k - y_{k-1}}{h_k}$$

$$\lim_{x \to x_k +} s'(x) = -\frac{1}{3} h_{k+1} M_k - \frac{1}{6} h_{k+1} M_{k+1} + \frac{y_{k+1} - y_k}{h_{k+1}}$$

$$\lim_{x \to x_k -} s'(x) = \lim_{x \to x_k +} s'(x)$$

$$\frac{1}{6} h_k M_{k-1} + \frac{1}{3} h_k M_k + \frac{y_k - y_{k-1}}{h_k} = -\frac{1}{3} h_{k+1} M_k - \frac{1}{6} h_{k+1} M_{k+1} + \frac{y_{k+1} - y_k}{h_{k+1}}$$

$$\frac{1}{6} h_k M_{k-1} + \frac{1}{3} h_k M_k + \frac{1}{3} h_{k+1} M_k + \frac{1}{6} h_{k+1} M_{k+1} = + \frac{y_{k+1} - y_k}{h_{k+1}} - \frac{y_k - y_{k-1}}{h_k}$$

$$\frac{1}{6} h_k M_{k-1} + \frac{1}{3} \left( h_k + h_{k+1} \right) M_k + \frac{1}{6} h_{k+1} M_{k+1} = + \frac{y_{k+1} - y_k}{h_{k+1}} - \frac{y_k - y_{k-1}}{h_k} \qquad k = 2; 3; \ldots; n-1$$

$$\lim_{x \to x_k -} s'(x) = \frac{1}{6} h_k M_{k-1} + \frac{1}{3} h_k M_k + \frac{y_k - y_{k-1}}{h_k}$$

$$\lim_{x \to x_k +} s'(x) = -\frac{1}{3} h_{k+1} M_k - \frac{1}{6} h_{k+1} M_{k+1} + \frac{y_{k+1} - y_k}{h_{k+1}}$$

$$\lim_{x \to x_k -} s'(x) = \lim_{x \to x_k +} s'(x)$$

$$\frac{1}{6} h_k M_{k-1} + \frac{1}{3} h_k M_k + \frac{y_k - y_{k-1}}{h_k} = -\frac{1}{3} h_{k+1} M_k - \frac{1}{6} h_{k+1} M_{k+1} + \frac{y_{k+1} - y_k}{h_{k+1}}$$

$$\frac{1}{6} h_k M_{k-1} + \frac{1}{3} h_k M_k + \frac{1}{3} h_{k+1} M_k + \frac{1}{6} h_{k+1} M_{k+1} = + \frac{y_{k+1} - y_k}{h_{k+1}} - \frac{y_k - y_{k-1}}{h_k}$$

$$\frac{1}{6} h_k M_{k-1} + \frac{1}{3} \left( h_k + h_{k+1} \right) M_k + \frac{1}{6} h_{k+1} M_{k+1} = + \frac{y_{k+1} - y_k}{h_{k+1}} - \frac{y_k - y_{k-1}}{h_k} \qquad k = 2; 3; \ldots; n-1$$

$$h_k M_{k-1} + 2\left( h_k + h_{k+1} \right) M_k + h_{k+1} M_{k+1} = 6 \cdot \frac{1}{h_k} y_{k-1} - 6 \cdot \left( \frac{1}{h_k} + \frac{1}{h_{k+1}} \right) y_k + 6 \cdot \frac{1}{h_{k+1}} y_{k+1} \qquad k = 2; 3; \ldots; n-1$$

$$\lim_{x\to x_k-} s'(x) = \frac{1}{6}h_k M_{k-1} + \frac{1}{3}h_k M_k + \frac{y_k - y_{k-1}}{h_k}$$

$$\lim_{x\to x_k+} s'(x) = -\frac{1}{3}h_{k+1} M_k - \frac{1}{6}h_{k+1} M_{k+1} + \frac{y_{k+1} - y_k}{h_{k+1}}$$

$$\lim_{x\to x_k-} s'(x) = \lim_{x\to x_k+} s'(x)$$

$$\frac{1}{6}h_k M_{k-1} + \frac{1}{3}h_k M_k + \frac{y_k - y_{k-1}}{h_k} = -\frac{1}{3}h_{k+1} M_k - \frac{1}{6}h_{k+1} M_{k+1} + \frac{y_{k+1} - y_k}{h_{k+1}}$$

$$\frac{1}{6}h_k M_{k-1} + \frac{1}{3}h_k M_k + \frac{1}{3}h_{k+1} M_k + \frac{1}{6}h_{k+1} M_{k+1} = +\frac{y_{k+1} - y_k}{h_{k+1}} - \frac{y_k - y_{k-1}}{h_k}$$

$$\frac{1}{6}h_k M_{k-1} + \frac{1}{3}\left(h_k + h_{k+1}\right) M_k + \frac{1}{6}h_{k+1} M_{k+1} = +\frac{y_{k+1} - y_k}{h_{k+1}} - \frac{y_k - y_{k-1}}{h_k} \qquad k = 2;3;\ldots;n-1$$

$$h_k M_{k-1} + 2\left(h_k + h_{k+1}\right) M_k + h_{k+1} M_{k+1} = 6\cdot\frac{1}{h_k} y_{k-1} - 6\cdot\left(\frac{1}{h_k} + \frac{1}{h_{k+1}}\right) y_k + 6\cdot\frac{1}{h_{k+1}} y_{k+1} \qquad k = 2;3;\ldots;n-1$$

Neznámé $M_1; M_2; \ldots; M_{n-1}$:

$$h_k M_{k-1} + 2\left(h_k + h_{k+1}\right) M_k + h_{k+1} M_{k+1} = 6 \cdot \frac{1}{h_k} y_{k-1} - 6 \cdot \left(\frac{1}{h_k} + \frac{1}{h_{k+1}}\right) y_k + 6 \cdot \frac{1}{h_{k+1}} y_{k+1} \qquad k = 2;3;\ldots;n-1$$

Neznámé $M_1; M_2; \ldots; M_{n-1}$:

$$\begin{pmatrix} 2\left(h_1 + h_2\right) & h_2 & 0 & \ldots. & 0 \\ h_2 & 2\left(h_2 + h_3\right) & h_3 & \ldots. & 0 \\ \ldots. & \ldots. & \ldots. & \ldots. & \ldots. \\ 0 & 0 & 0 & \ldots. & 2\left(h_{n-1} + h_n\right) \end{pmatrix} \begin{pmatrix} M_1 \\ M_2 \\ \ldots. \\ M_{n-1} \end{pmatrix} = 6 \begin{pmatrix} \frac{1}{h_1} y_0 - \left(\frac{1}{h_1} + \frac{1}{h_2}\right) y_1 + \frac{1}{h_2} y_2 \\ \frac{1}{h_2} y_1 - \left(\frac{1}{h_2} + \frac{1}{h_3}\right) y_2 + \frac{1}{h_3} y_3 \\ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \\ \frac{1}{h_{n-1}} y_{n-2} - \left(\frac{1}{h_{n-1}} + \frac{1}{h_n}\right) y_{n-1} + \frac{1}{h_n} y_n \end{pmatrix}$$

Volíme $M_0$; $M_n$:

$$h_k M_{k-1} + 2(h_k + h_{k+1}) M_k + h_{k+1} M_{k+1} = 6 \cdot \frac{1}{h_k} y_{k-1} - 6 \cdot \left( \frac{1}{h_k} + \frac{1}{h_{k+1}} \right) y_k + 6 \cdot \frac{1}{h_{k+1}} y_{k+1} \qquad k = 2; 3; ...; n-1$$

Neznámé $M_1; M_2; ...; M_{n-1}$:

$$\begin{pmatrix} 2(h_1 + h_2) & h_2 & 0 & .... & 0 \\ h_2 & 2(h_2 + h_3) & h_3 & .... & 0 \\ .... & .... & .... & .... & .... \\ 0 & 0 & 0 & .... & 2(h_{n-1} + h_n) \end{pmatrix} \begin{pmatrix} M_1 \\ M_2 \\ .... \\ M_{n-1} \end{pmatrix} = 6 \begin{pmatrix} \frac{1}{h_1} y_0 - \left( \frac{1}{h_1} + \frac{1}{h_2} \right) y_1 + \frac{1}{h_2} y_2 \\ \frac{1}{h_2} y_1 - \left( \frac{1}{h_2} + \frac{1}{h_3} \right) y_2 + \frac{1}{h_3} y_3 \\ ................................ \\ \frac{1}{h_{n-1}} y_{n-2} - \left( \frac{1}{h_{n-1}} + \frac{1}{h_n} \right) y_{n-1} + \frac{1}{h_n} y_n \end{pmatrix}$$

Volíme $M_0; M_n$: $\qquad M_0 = M_n = 0$:

$$\frac{1}{6} h_k M_{k-1} + \frac{1}{3}(h_k + h_{k+1}) M_k + \frac{1}{6} h_{k+1} M_{k+1} = + \frac{y_{k+1} - y_k}{h_{k+1}} - \frac{y_k - y_{k-1}}{h_k} \; / \cdot 6 \qquad k = 2; 3; ...; n-1$$

$$h_k M_{k-1} + 2(h_k + h_{k+1}) M_k + h_{k+1} M_{k+1} = 6 \cdot \frac{1}{h_k} y_{k-1} - 6 \cdot \left( \frac{1}{h_k} + \frac{1}{h_{k+1}} \right) y_k + 6 \cdot \frac{1}{h_{k+1}} y_{k+1} \qquad k = 2;3;\dots;n-1$$

Neznámé $M_1; M_2; \dots; M_{n-1}$:

$$\begin{pmatrix} 2(h_1+h_2) & h_2 & 0 & \dots & 0 \\ h_2 & 2(h_2+h_3) & h_3 & \dots & 0 \\ \dots & \dots & \dots & \dots & \dots \\ 0 & 0 & 0 & \dots & 2(h_{n-1}+h_n) \end{pmatrix} \begin{pmatrix} M_1 \\ M_2 \\ \dots \\ M_{n-1} \end{pmatrix} = 6 \begin{pmatrix} \frac{1}{h_1} y_0 - \left( \frac{1}{h_1} + \frac{1}{h_2} \right) y_1 + \frac{1}{h_2} y_2 \\ \frac{1}{h_2} y_1 - \left( \frac{1}{h_2} + \frac{1}{h_3} \right) y_2 + \frac{1}{h_3} y_3 \\ \dots\dots\dots\dots \\ \frac{1}{h_{n-1}} y_{n-2} - \left( \frac{1}{h_{n-1}} + \frac{1}{h_n} \right) y_{n-1} + \frac{1}{h_n} y_n \end{pmatrix}$$

Volíme $M_0; M_n$: $\qquad M_0 = M_n = 0$:

$$s(x) = M_{k-1} \frac{(x_k - x)^3}{6h_k} + M_k \frac{(x - x_{k-1})^3}{6h_k} + \left( y_{k-1} - \frac{M_{k-1} h_k^2}{6} \right) \frac{x_k - x}{h_k} + \left( y_k - \frac{M_k h_k^2}{6} \right) \frac{x - x_{k-1}}{h_k} \; ; \qquad k = 1,\dots,n$$

$$h_k M_{k-1} + 2\left(h_k + h_{k+1}\right) M_k + h_{k+1} M_{k+1} = 6 \cdot \frac{1}{h_k} y_{k-1} - 6 \cdot \left(\frac{1}{h_k} + \frac{1}{h_{k+1}}\right) y_k + 6 \cdot \frac{1}{h_{k+1}} y_{k+1} \qquad k = 2;3;\ldots;n-1$$

Neznámé $M_1; M_2; \ldots; M_{n-1}$:

$$\begin{pmatrix} 2\left(h_1 + h_2\right) & h_2 & 0 & \ldots & 0 \\ h_2 & 2\left(h_2 + h_3\right) & h_3 & \ldots & 0 \\ \ldots & \ldots & \ldots & \ldots & \ldots \\ 0 & 0 & 0 & \ldots & 2\left(h_{n-1} + h_n\right) \end{pmatrix} \begin{pmatrix} M_1 \\ M_2 \\ \ldots \\ M_{n-1} \end{pmatrix} = 6 \begin{pmatrix} \frac{1}{h_1} y_0 - \left(\frac{1}{h_1} + \frac{1}{h_2}\right) y_1 + \frac{1}{h_2} y_2 \\ \frac{1}{h_2} y_1 - \left(\frac{1}{h_2} + \frac{1}{h_3}\right) y_2 + \frac{1}{h_3} y_3 \\ \ldots\ldots\ldots\ldots \\ \frac{1}{h_{n-1}} y_{n-2} - \left(\frac{1}{h_{n-1}} + \frac{1}{h_n}\right) y_{n-1} + \frac{1}{h_n} y_n \end{pmatrix}$$

Volíme $M_0; M_n$: $\qquad M_0 = M_n = 0$:

$$s(x) = M_{k-1} \frac{\left(x_k - x\right)^3}{6h_k} + M_k \frac{\left(x - x_{k-1}\right)^3}{6h_k} + \left(y_{k-1} - \frac{M_{k-1} h_k^2}{6}\right) \frac{x_k - x}{h_k} + \left(y_k - \frac{M_k h_k^2}{6}\right) \frac{x - x_{k-1}}{h_k} \;; \qquad k = 1, \ldots, n$$

$$h_k M_{k-1} + 2\left(h_k + h_{k+1}\right) M_k + h_{k+1} M_{k+1} = 6 \cdot \frac{1}{h_k} y_{k-1} - 6 \cdot \left(\frac{1}{h_k} + \frac{1}{h_{k+1}}\right) y_k + 6 \cdot \frac{1}{h_{k+1}} y_{k+1} \qquad k = 2;3;\dots;n-1$$

Neznámé $M_1; M_2; \dots; M_{n-1}$:

$$\begin{pmatrix} 2\left(h_1 + h_2\right) & h_2 & 0 & \dots & 0 \\ h_2 & 2\left(h_2 + h_3\right) & h_3 & \dots & 0 \\ \dots & \dots & \dots & \dots & \dots \\ 0 & 0 & 0 & \dots & 2\left(h_{n-1} + h_n\right) \end{pmatrix} \begin{pmatrix} M_1 \\ M_2 \\ \dots \\ M_{n-1} \end{pmatrix} = 6 \begin{pmatrix} \frac{1}{h_1} y_0 - \left(\frac{1}{h_1} + \frac{1}{h_2}\right) y_1 + \frac{1}{h_2} y_2 \\ \frac{1}{h_2} y_1 - \left(\frac{1}{h_2} + \frac{1}{h_3}\right) y_2 + \frac{1}{h_3} y_3 \\ \dots\dots\dots\dots\dots\dots \\ \frac{1}{h_{n-1}} y_{n-2} - \left(\frac{1}{h_{n-1}} + \frac{1}{h_n}\right) y_{n-1} + \frac{1}{h_n} y_n \end{pmatrix}$$

Volíme $M_0; M_n$: $\qquad M_0 = M_n = 0$:

$$s(x) = M_{k-1} \frac{\left(x_k - x\right)^3}{6h_k} + M_k \frac{\left(x - x_{k-1}\right)^3}{6h_k} + \left(y_{k-1} - \frac{M_{k-1} h_k^2}{6}\right) \frac{x_k - x}{h_k} + \left(y_k - \frac{M_k h_k^2}{6}\right) \frac{x - x_{k-1}}{h_k} \; ; \qquad k = 1, \dots, n$$