x_i	4	6	8	10
y_i	6	3	9	0

$S_i = 0, 1, 2$,

Koeffizienten $= a_i, b_i, c_i, d_i$

Algorithmus:

1. $a_i = y_i$ 3. $c_0 = 0, c_n = 0$

2. $h_i = x_{i+1} - x_i$

4a) $i = 1:$

$$2(h_0 + h_1)c_1 + h_1 c_2 = 3\frac{y_2 - y_1}{h_1} - 3\frac{y_1 - y_0}{h_0}$$

4b) Falls $n \geq 4$ $\forall i = 2, \dots, n-2$

$$h_{i-1}c_{i-1} + 2(h_{i-1} + h_i)c_i + h_i c_{i+1} = 3\frac{y_{i+1} - y_i}{h_i} - 3\frac{y_i - y_{i-1}}{h_i - 1}$$

4c) $i = n-1$

$$h_{n-2}c_{n-2} + 2(h_{n-2} + h_{n-1})c_{n-1} = 3\frac{y_n - y_{n-1}}{h_n - 1} - 3\frac{y_{n-1} - y_{n-2}}{h_{n-2}}$$

5. $b_i = \frac{y_{i+1} - y_i}{h_i} - \frac{h_i}{3}(c_{i+1} + 2c_i)$

6. $d_i = \frac{1}{3h_i}(c_{i+1} - c_i)$

$h_0 = x_1 - x_0 = 6 - 4 = 2$, $h_1 = x_2 - x_1 = 8 - 6 = 2$, $h_3 = x_4 - x_3 = 10 - 8 = 2$

$\underline{c_0 = c_3 = 0}$

$$\begin{matrix} i = 1 \\ i = 2 \end{matrix} \begin{pmatrix} 2(h_0 + h_1) & h_1 \\ h_1 & 2(h_1 + h_2) \end{pmatrix} \begin{pmatrix} c_1 \\ c_2 \end{pmatrix} = 3 \begin{pmatrix} \frac{y_2 - y_1}{h_1} - \frac{y_1 - y_0}{h_0} \\ \frac{y_3 - y_2}{h_2} - \frac{y_2 - y_1}{h_1} \end{pmatrix}$$

$$\begin{pmatrix} 8 & 2 \\ 2 & 8 \end{pmatrix} \begin{pmatrix} c_1 \\ c_2 \end{pmatrix} = 3 \begin{pmatrix} 4.5 \\ -7.5 \end{pmatrix} = \begin{pmatrix} 13.5 \\ -22.5 \end{pmatrix}$$

$\Rightarrow \begin{pmatrix} 8 & 2 \\ 0 & 7.5 \end{pmatrix} = \begin{pmatrix} 13.5 \\ -25.875 \end{pmatrix} \rightarrow$

$c_1 = \frac{13.5 - 2(-3.45)}{8} = \underline{\underline{2.55}}$

$c_2 = -25.875/7.5 = \underline{\underline{-3.45}}$

$$b_0 = \frac{y_1 - y_0}{h_0} - \frac{h_0}{8}(c_1 + 2c_0) = -1.5 - \frac{6}{3}(2.55) = \underline{\underline{-3.2}}$$

$$b_1 = \frac{y_2 - y_1}{h_1} - \frac{h_1}{3}(c_2 + 2c_1) = 3 - \frac{2}{3}(-3.45 + 2(2.55)) = \underline{\underline{1.9}}$$

$$b_2 = \frac{y_3 - y_2}{h_2} - \frac{h_2}{3}(c_3 + 2c_2) = -4.5 - \frac{2}{3}(2 \cdot (-3.45)) = \underline{\underline{0.1}}$$

$$d_0 = \frac{1}{3h_0}(c_1 - c_0) = \frac{1}{6}(2.55) = \underline{0.425}$$

$$d_1 = \frac{1}{3h_1}(c_2 - c_1) = \frac{1}{6}(-3.45 - 2.55) = \underline{\underline{-1}}$$

$$d_2 = \frac{1}{3h_2}(c_3 - c_2) = \frac{1}{6}(+3.45) = \underline{\underline{0.575}}$$

$a_0 = 6$
$a_1 = 3$
$a_2 = 9$
$a_3 = 0$