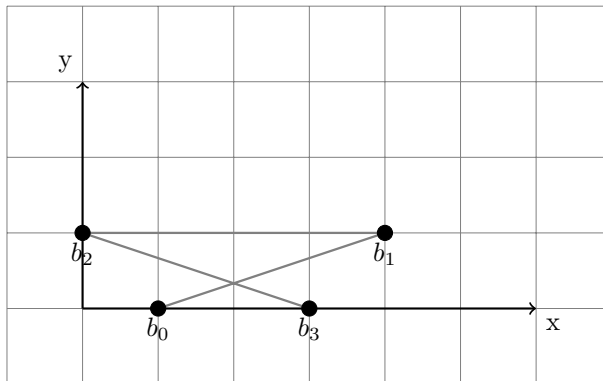


Computer Grafik Blatt 9

June 2023

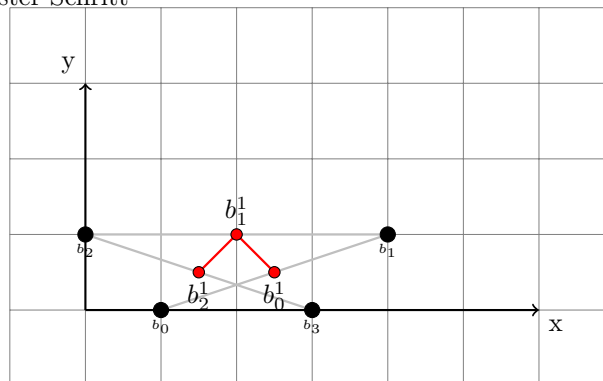
Aufgabe 1.

(a)

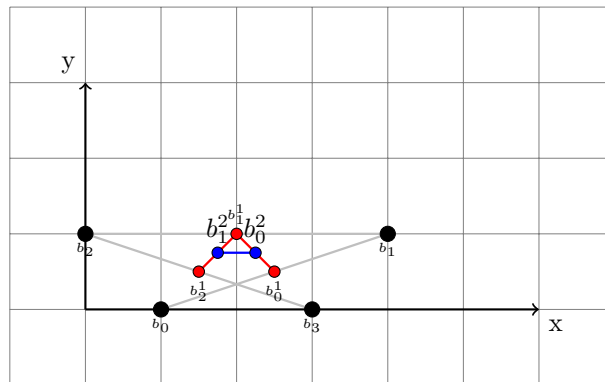


(b)

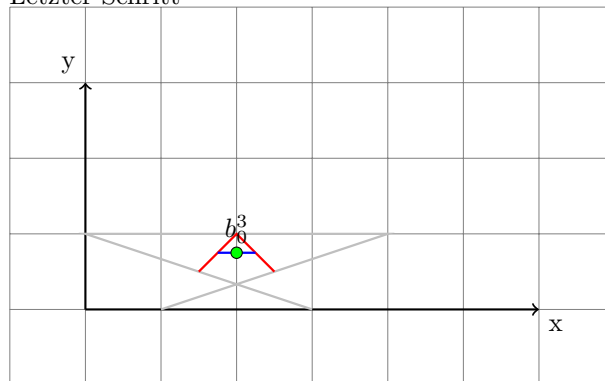
Erster Schritt



Zweiter Schritt

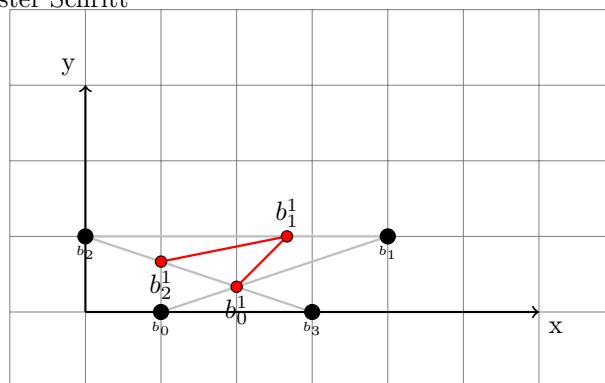


Letzter Schritt

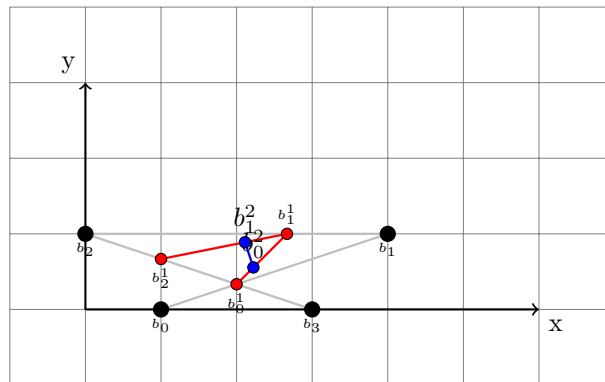


(c)

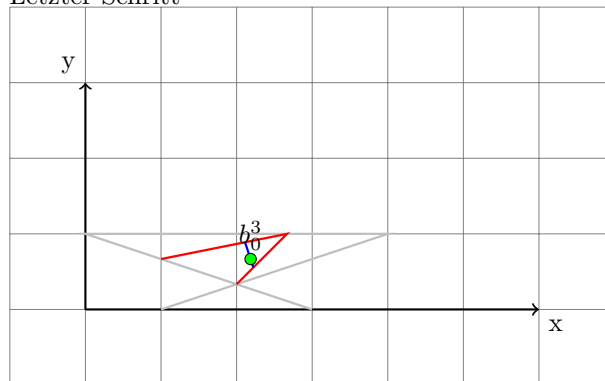
Erster Schritt



Zweiter Schritt



Letzter Schritt



(d)

$$\begin{aligned}b_0^1 &= \frac{3}{4}b_0 + \frac{1}{4}b_1 \\&= \frac{3}{4} \cdot (1, 0)^T + \frac{1}{4} \cdot (4, 1)^T \\&= \left(\frac{7}{4}, \frac{1}{4}\right)^T\end{aligned}$$

$$\begin{aligned}b_1^1 &= \frac{3}{4}b_1 + \frac{1}{4}b_2 \\&= \frac{3}{4} \cdot (4, 1)^T + \frac{1}{4} \cdot (0, 1)^T \\&= (3, 1)^T\end{aligned}$$

$$\begin{aligned}b_2^1 &= \frac{3}{4}b_2 + \frac{1}{4}b_3 \\&= \frac{3}{4} \cdot (0, 1)^T + \frac{1}{4} \cdot (3, 0)^T \\&= \left(\frac{3}{4}, 1\right)^T\end{aligned}$$

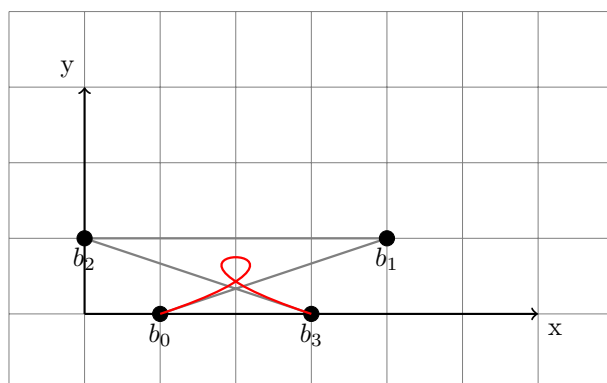
$$\begin{aligned}b_1^2 &= \frac{3}{4}b_0^1 + \frac{1}{4}b_1^1 \\&= \frac{3}{4} \cdot \left(\frac{7}{4}, \frac{1}{4}\right)^T + \frac{1}{4} \cdot (3, 1)^T \\&= \left(\frac{33}{16}, \frac{7}{16}\right)^T\end{aligned}$$

$$\begin{aligned}b_2^2 &= \frac{3}{4}b_1^1 + \frac{1}{4}b_2^1 \\&= \frac{3}{4} \cdot (3, 1)^T + \frac{1}{4} \cdot \left(\frac{3}{4}, 1\right)^T \\&= \left(\frac{39}{16}, 1\right)^T\end{aligned}$$

$$\begin{aligned}
 b_0^3 &= \frac{3}{4}b_0^2 + \frac{1}{4}b_1^2 \\
 &= \frac{3}{4} \cdot \left(\frac{33}{16}, \frac{7}{16}\right)^T + \frac{1}{4} \cdot \left(\frac{39}{16}, 1\right)^T \\
 &= \left(\frac{69}{32}, \frac{37}{64}\right)^T
 \end{aligned}$$

(e)

(f)



(g)

$$\begin{aligned}
 b_0^1 &= \frac{1}{3} \cdot b_0 + \frac{2}{3} \cdot b_1 \\
 &= \frac{1}{3} \cdot (1, 2, 3, 4)^T + \frac{2}{3} \cdot (1, 3, 3, 7)^T \\
 &= \left(1, \frac{8}{3}, 3, 6\right)^T
 \end{aligned}$$

(h)