$f(x) = ax^4 + bx^3 + cx^2 + dx + k$

$f(0) = 3$

$f'(0) = 1$

$f'(x) = 4ax^3 + 3bx^2 + 2cx + d$

$f(x) = ax^4 + bx^3 + cx^2 + x + 3$

B3: $f(4) = 10$

B4: $f'(2) = 0$

B5: $f''(3) = -2$

$f(x) = ax^4 + bx^3 + cx^2 + x + 3$

$f'(x) = 4ax^3 + 3bx^2 + 2cx + 1$

$f''(x) = 12ax^2 + 6bx + 2c$

I $a \cdot 4^4 + b \cdot 4^3 + c \cdot 4^2 + 4 + 3 = 10$

II $4a \cdot 2^3 + 3b \cdot 2^2 + 2c \cdot 2 + 1 = 0$

III $12a \cdot 3^2 + 6b \cdot 3 + 2c = -2$

I $256a + 64b + 16c + 7 = 10 \quad | -7$

II $32a + 12b + 4c + 1 = 0 \quad | -1$

III $108a + 18b + 2c = -2$

I $256a + 64b + 16c = 10$

II $32a + 12b + 4c = 0$

III $108a + 18b + 2c = -2$

256	64	16	3	:4
32	12	4	-1	
108	18	2	-2	·2
64	16	4	0,75	
32	12	4	-1	
216	36	4	-4	

g: $\vec{x} = \begin{pmatrix}1\\3\\-4\end{pmatrix} + r\begin{pmatrix}-5\\1\\2\end{pmatrix}$ P: $(-2|6|1)$

1) $\vec{OL} = \begin{pmatrix}1\\3\\-4\end{pmatrix} + r^*\begin{pmatrix}-5\\1\\2\end{pmatrix}$ 2) $\vec{OP} = \begin{pmatrix}-2\\6\\1\end{pmatrix}$

3) $\vec{PL} = \vec{OL} - \vec{OP} = \begin{pmatrix}1\\3\\-4\end{pmatrix} + r^*\begin{pmatrix}-5\\1\\2\end{pmatrix} - \begin{pmatrix}-2\\6\\1\end{pmatrix}$

$\vec{PL} = \begin{pmatrix}3\\-3\\-5\end{pmatrix} + r^*\begin{pmatrix}-5\\1\\2\end{pmatrix}$

4) Skalarprodukt $= 0$

$0 = \vec{PL} \cdot$ Richtungsvektor von g

$$\left[\begin{pmatrix}3\\-3\\-5\end{pmatrix} + r^*\begin{pmatrix}-5\\1\\2\end{pmatrix}\right] \cdot \begin{pmatrix}-5\\1\\2\end{pmatrix} = 0$$

$$\begin{pmatrix}3\\-3\\-5\end{pmatrix} \cdot \begin{pmatrix}-5\\1\\2\end{pmatrix} + r^*\begin{pmatrix}-5\\1\\2\end{pmatrix} \cdot \begin{pmatrix}-5\\1\\2\end{pmatrix} = 0$$

$$-15 - 3 - 10 + r^*(25 + 1 + 4) = 0$$

$$-28 + r^* \cdot 30 = 0 \quad | +28$$

$$r^* \cdot 30 = 28 \quad | :30$$

$$r^* = \frac{28}{30} = \frac{14}{15} = 0{,}95$$

$$\vec{PL} = \begin{pmatrix}3\\-3\\-5\end{pmatrix} \cdot \frac{14}{15} \cdot \begin{pmatrix}-5\\1\\2\end{pmatrix} = \begin{pmatrix}-1{,}6\\-2{,}06\\-3{,}13\end{pmatrix}$$

$$|\vec{PL}| = \sqrt{(-1{,}6)^2 + (-2{,}06)^2 + (-3{,}13)^2} = 4{,}1069$$

$g_1: \vec{x} = \begin{pmatrix}1\\3\\-1\end{pmatrix} + r\begin{pmatrix}2\\1\\4\end{pmatrix}$

$g_2: \vec{x} = \begin{pmatrix}4\\2\\1\end{pmatrix} + k\begin{pmatrix}3\\4\\10\end{pmatrix}$

$g_1 = g_2$

$\begin{pmatrix}1\\3\\-1\end{pmatrix} + r\begin{pmatrix}2\\1\\4\end{pmatrix} = \begin{pmatrix}4\\2\\1\end{pmatrix} + t\begin{pmatrix}3\\4\\10\end{pmatrix}$

$$\begin{array}{ll} x)\ 1+2r = 4+3t & \mid -3t \\ y)\ 3+1r = 2+4t & \mid -4t \\ z)\ -1+4r = 1+10t & \mid -10t \end{array}$$

$$\begin{array}{ll} x)\ 1+2r-3t = 4 & \mid -1 \\ y)\ 3+1r-4t = 2 & \mid -3 \\ z)\ -1+4r-10t = 1 & \mid +1 \end{array}$$

$$\begin{array}{l} x)\ 2r-3t = 3 \\ y)\ 1r-4t = -1 \\ z)\ 4r-10t = 2 \end{array}$$

$$\begin{array}{ll} 2r-3t = 3 & \\ 1r-4t = -1 & \mid \cdot 2 \end{array}$$

$$\begin{array}{ll} 2r-3t = 3 & \\ 2r-8t = -2 & - \end{array}$$

$5t = 5 \quad |:5$

$t = 1$ einsetzen in x

$2r - 3\cdot 1 = 3 \quad |+3$

$2r = 6 \quad |:2$

$r = 3$

z) $4\cdot 3 - 10\cdot 1 = 2$

$2 = 2$ wahr, denn S existiert!

$g: \vec{x} = \begin{pmatrix}-2\\1\\3\end{pmatrix} + k\begin{pmatrix}8\\-2\\3\end{pmatrix}$

$E: \vec{x} = \begin{pmatrix}-1\\3\\-2\end{pmatrix} + r\begin{pmatrix}5\\-2\\3\end{pmatrix} + s\begin{pmatrix}-1\\3\\-7\end{pmatrix}$

$g = E$

$$\begin{array}{ccc|c} r & s & k & \\ -5 & 1 & 8 & -3 \\ 6 & -9 & -6 & 6 \\ -6 & 14 & 6 & -10 \end{array}$$

$$\begin{array}{ccc|cl} 8 & 1 & -5 & -3 & \\ -6 & -9 & 6 & 6 & + \\ 6 & 14 & -6 & -10 & \end{array}$$

$$\begin{array}{ccc|cl} 8 & 1 & -5 & -3 & \mid\cdot 6 \\ -6 & -9 & 6 & 6 & \mid\cdot 5 \\ 0 & 5 & 0 & -4 & \end{array}$$

$$\begin{array}{ccc|cl} 48 & 6 & -30 & -18 & \\ -30 & -45 & 30 & 30 & + \\ 0 & 5 & 0 & -4 & \end{array}$$

$$\begin{array}{ccc|cl} 48 & 6 & -30 & -18 & \\ 18 & -39 & 0 & 12 & \mid\cdot 5 \\ 0 & 5 & 0 & -4 & \mid\cdot 39 \end{array}$$

$$\begin{array}{ccc|cl} 48 & 6 & -30 & -18 & \\ 90 & -39\cdot 5 & 0 & 60 & \\ 0 & 39\cdot 5 & 0 & -156 & + \end{array}$$

$$\begin{array}{ccc|c} 48 & 6 & -30 & -18 \\ 90 & -39\cdot 5 & 0 & 60 \\ 90 & 0 & 0 & -96 \end{array}$$

$K = -\frac{96}{90} = -1\frac{1}{15}$

$\vec{OD} = \begin{pmatrix}-2\\1\\3\end{pmatrix} - \frac{16}{15}\cdot\begin{pmatrix}8\\-2\\3\end{pmatrix} = \begin{pmatrix}-10{,}53\\3{,}13\\-0{,}2\end{pmatrix}$