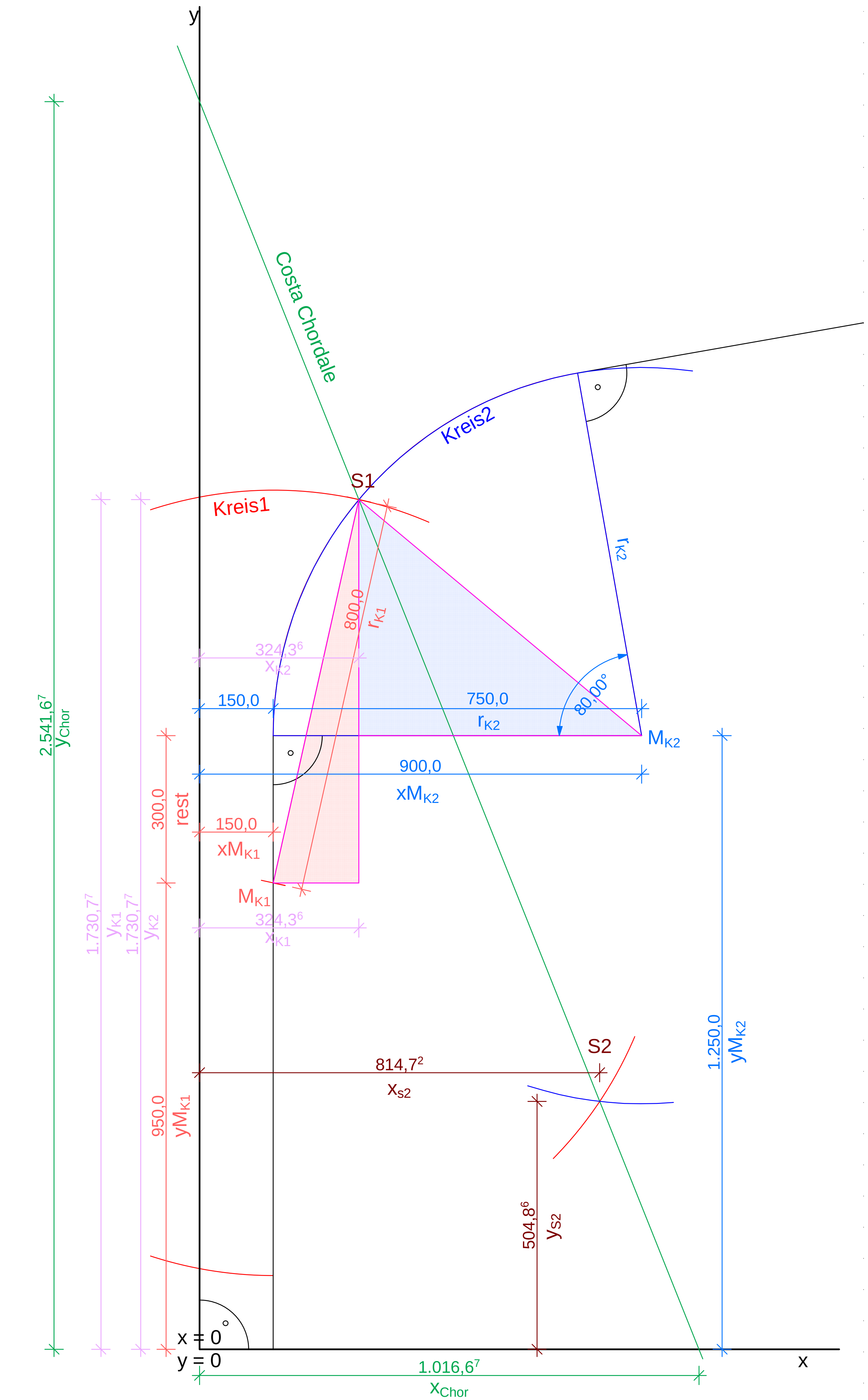


y
x
Costa Chordale
Kreis2
Kreis1
S1
S2
r_{K1}
r_{K2}
M_{K2}
M_{K1}
800,0
$324,3^6$
x_{K2}
150,0
750,0
r_{K2}
80,00°
900,0
xM_{K2}
300,0
rest
150,0
xM_{K1}
$324,3^6$
x_{K1}
$1.730,7^7$
y_{K1}
$1.730,7^7$
y_{K2}
$2.541,6^7$
y_{Chor}
$814,7^2$
x_{s2}
$504,8^6$
y_{S2}
950,0
yM_{K1}
1.250,0
yM_{K2}
x = 0
y = 0
$1.016,6^7$
x_{Chor}

(1)

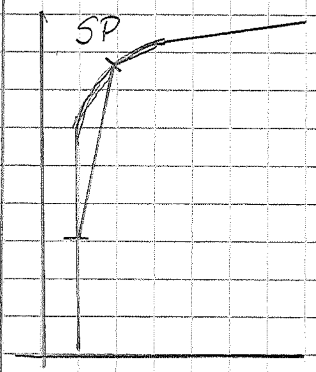
26.2.2016

Schnittpkt.-berechnung von 2 Kreisen für Sektionaltor

geprüft Strunk

$K1: \quad M_1 \, (x_{MK1} \mid y_{MK1}) \quad r_{K1}$

$K2: \quad M_2 \, (x_{MK2} \mid y_{MK2}) \quad r_{K2}$



⇓

Kreisgleichungen

✓ $K1: (x_{K1} - x_{MK1})^2 + (y_{K1} - y_{MK1})^2 = r_{K1}^2$

✓ $K2: (x_{MK2} - x_{K2})^2 + (y_{K2} - y_{MK2})^2 = r_{K2}^2$

$x_{K1} = x_{K2}$ & $y_{K1} = y_{K2}$ (da Schnittpkt ja gesucht ist)

$K1: (x - x_{MK1})^2 + (y - y_{MK1})^2 = r_{K1}^2$

$K2: (x_{MK2} - x)^2 + (y - y_{MK2})^2 = r_{K2}^2$

1*

✓ $K1: x^2 - 2 \cdot x \cdot x_{MK1} + x_{MK1}^2 + y^2 - 2y \cdot y_{MK1} + y_{MK1}^2 = r_{K1}^2$

$K2: x^2 - 2 \cdot x \cdot x_{MK2} + x_{MK2}^2 + y^2 - 2y \cdot y_{MK2} + y_{MK2}^2 = r_{K2}^2 \quad | \cdot (-1)$

$K1: \cancel{x^2} - 2x\, x_{MK1} + x_{MK1}^2 + \cancel{y^2} - 2y\, y_{MK1} + y_{MK1}^2 = r_{K1}^2 \quad | +$

$K2: \cancel{-x^2} + 2x\, x_{MK2} - x_{MK2}^2 - \cancel{y^2} + 2y \cdot y_{MK2} - y_{MK2}^2 = -r_{K2}^2$

$-2x \cdot \overset{150}{x_{MK1}} + 2x \cdot \overset{900}{x_{MK2}} + x_{MK1}^2 - x_{MK2}^2 - 2y \cdot y_{MK1} + 2y \cdot y_{MK2} + y_{MK1}^2 - y_{MK2}^2 = r_{K1}^2 - r_{K2}^2$

$-2x \cdot x_{M1} + 2x \cdot x_{M2} + \underbrace{x_{M1}^2 - x_{M2}^2}_{0{,}15 \quad 0{,}90} - 2y \cdot y_{M1} + 2y \cdot y_{M2} + \underbrace{y_{M1}^2 - y_{M2}^2}_{0{,}95 \quad 1{,}25} = \underbrace{r_{K1}^2 - r_{K2}^2}_{0{,}80 \quad 0{,}75}$

gegebene Werte ⇒ Wlp 1   Wlp 2   Wlp 3

$\boxed{\text{aus } MK1 \text{ wird } M1}$

Wlp 1 = −0,7875

Wlp 2 = −0,6600

Wlp 3 = 0,0775

$\cancel{-2x \cdot x_{M1}} +$

⇒ geprüft, stimmt

②

$$-2x \cdot x_{M1} + 2x \cdot x_{M2} + \underbrace{hlp1 - 2y \cdot y_{M1} + 2y \cdot y_{M2} + hlp2 - hlp3}_{hlp4} = 0$$

$$-2x \cdot x_{M1} + 2x \cdot x_{M2} - 2y \cdot y_{M1} + 2y \cdot y_{M2} + hlp4 = 0$$

$$-2x \cdot \underbrace{(\underset{0{,}75}{x_{M1}} - \underset{0{,}9}{x_{M2}})}_{hlp5} - 2y\,\underbrace{(\underset{0{,}75}{y_{M1}} - \underset{1{,}25}{y_{M2}})}_{hlp6} + hlp4 = 0$$

$$\underbrace{-2 \cdot hlp5}_{hlp7} \cdot x \quad \underbrace{-2 \cdot hlp6}_{hlp8} \cdot y + hlp4 = 0$$

✓ $hlp7 \cdot x + hlp8 \cdot y + hlp4 = 0$ (stimmt) / nach x umstellen

$$x = \underbrace{\left(\frac{-hlp8}{hlp7}\right)}_{hlp9} \cdot y + \underbrace{\left(-\frac{hlp4}{hlp7}\right)}_{hlp10}$$

✓ $x = hlp9 \cdot y + hlp10$ (stimmt)

$\boxed{\text{Chordale}}$

(Gerade durch beide Schnittpunkte d. Kreise)

dieses x muß in (1*) von Seite 1 eingesetzt werden.

$hlp1 = -0{,}7875$
$hlp2 = -0{,}6600$
$hlp3 = 0{,}0775$

$hlp4 = -1{,}525$

$hlp5 = -0{,}75$
$hlp6 = -0{,}3$

$hlp7 = +1{,}5$
$hlp8 = +0{,}6$

$hlp9 = -0{,}40$
$hlp10 = +1{,}016\overline{6}$

⇐ Geprüft, stimmt

$$K1:\quad x^2 - 2x\cdot x_{M1} + x_{M1}^2 \quad + \quad y^2 - 2\cdot y\cdot y_{M1} + y_{M1}^2 \quad = v_{K1}^2 \quad (\text{von Seite } 1)$$

$$\checkmark \quad x = \mathrm{hlp}\,9\cdot y + \mathrm{hlp}\,10 \quad (\text{von Seite } 2)$$

$$K1:\quad x^2 \underbrace{- 2\cdot \overset{0{,}15}{x_{M_1}}}_{\mathrm{hlp}\,11}\cdot x + y^2 \underbrace{- 2\cdot \overset{0{,}95}{y_{M1}}}_{\mathrm{hlp}\,12}\cdot y + \underbrace{\overset{0{,}15}{x_{M1}}{}^2 + \overset{0{,}95}{y_{M1}}{}^2 - \overset{0{,}8}{v_{K1}}{}^2}_{\mathrm{hlp}\,13} = 0$$

$$\checkmark\, K1:\quad x^2 + y^2 + \mathrm{hlp}\,11\cdot x + \mathrm{hlp}\,12\cdot y + \mathrm{hlp}\,13 = 0 \quad (\text{stimmt})$$

$$K1:\quad (\mathrm{hlp}\,9\cdot y + \mathrm{hlp}\,10)^2 + y^2 + \mathrm{hlp}\,11\cdot(\mathrm{hlp}\,9\cdot y + \mathrm{hlp}\,10) + \mathrm{hlp}\,12\cdot y + \mathrm{hlp}\,13 = 0$$

$$K1:\quad \underline{(\mathrm{hlp}\,9\cdot y + \mathrm{hlp}\,10)^2} + \underline{y^2} + \underbrace{\mathrm{hlp}\,11\cdot \mathrm{hlp}\,9}_{\mathrm{const}\,1}\cdot y + \underbrace{\mathrm{hlp}\,11\cdot \mathrm{hlp}\,10}_{\mathrm{const}\,2} + \mathrm{hlp}\,12\cdot y + \mathrm{hlp}\,13 = 0$$

$$K1:\quad (\mathrm{hlp}\,9\cdot y + \mathrm{hlp}\,10)^2 + y^2 + \underbrace{\mathrm{const}\,1\cdot y + \mathrm{hlp}\,12\cdot y}_{\mathrm{const}\,3} + \underbrace{\mathrm{const}\,2 + \mathrm{hlp}\,13}_{\mathrm{const}\,4} = 0$$

$$\checkmark\, K1:\quad (\mathrm{hlp}\,9\cdot y + \mathrm{hlp}\,10)^2 + y^2 + \mathrm{const}\,3\cdot y + \mathrm{const}\,4 = 0$$

$$K1:\quad \cancel{\mathrm{hlp}\,9^2\cdot y^2 + 2\cdot \mathrm{hlp}\,9\cdot \mathrm{hlp}\,10\cdot y + \mathrm{hlp}\,10^2 + y^2 + \mathrm{const}\,3\cdot y + \mathrm{const}\,4} = 0$$

$$K1:\quad \mathrm{hlp}\,9^2\cdot y^2 + 1{,}0\cdot y^2 + \underbrace{2\cdot \overset{}{\underset{-0{,}4}{\mathrm{hlp}\,9}}\cdot \underset{1{,}0166}{\mathrm{hlp}\,10}}_{\mathrm{const}\,6}\cdot y + \mathrm{const}\,3\cdot y + \underbrace{\mathrm{hlp}\,10^2 + \mathrm{const}\,4}_{\mathrm{const}\,7} = 0$$

$$\underbrace{(0{,}40^2 + 1{,}0)}_{\mathrm{const}\,5}$$

$$\checkmark\, K1:\quad \mathrm{const}\,5\cdot y^2 + \underbrace{\mathrm{const}\,6\cdot y + \mathrm{const}\,3\cdot y}_{\mathrm{const}\,8} + \mathrm{const}\,7 = 0$$

$$\checkmark\, K1:\quad \mathrm{const}\,5\cdot y^2 + \mathrm{const}\,8\cdot y + \mathrm{const}\,7 = 0$$

(3)

$\mathrm{hlp}\,9 = -0{,}40$
$\mathrm{hlp}\,10 = +1{,}0166$

$\mathrm{hlp}\,11 = -0{,}30$
$\mathrm{hlp}\,12 = -1{,}90$
$\mathrm{hlp}\,13 = 0{,}285$

$\mathrm{const}\,1 = 0{,}12$
$\mathrm{const}\,2 = -0{,}305$

$\mathrm{const}\,3 = -1{,}78$
$\mathrm{const}\,4 = -0{,}02$

$\mathrm{const}\,5 = 1{,}16$
$\mathrm{const}\,6 = -0{,}8133$
$\mathrm{const}\,7 = 1{,}0136$

$\mathrm{const}\,8 = -2{,}5933$

⇒ gemerkt!! 5.7.11

$K1: const5 \cdot y^2 + const8 \cdot y + const7 = 0$ (Formel f. quad. Ergänzg.)

$K1: y^2 + \frac{const8}{const5} \cdot y + \underbrace{\frac{const7}{const5}}_{const9} = 0$

$K1: y^2 + \frac{const8}{const5} \cdot y + const9 = 0 \quad | - const9$

$p = \frac{const8}{const5} \quad \& \quad q = \left(\frac{p}{2}\right)^2$

$K1: y^2 + p \cdot y = - const9 \quad | + q$

$\sqrt{K1}: y^2 + p \cdot y + q = \underbrace{- const9 + q}_{const10}$ (st—)

$const11_a = p/2$

$const11_b = -p/2$

$K1: (y + const11_a)^2 = const10$

$K1: y = \sqrt{const10} - const11$

$\underline{\underline{y = 1{,}7307}}$ Jawolljá Oljá

$K1: x = wlp9 \cdot y + wlp10$

$\underline{\underline{x = 0{,}324}}$

$const5 = 1{,}16$
$const7 = 1{,}0136$
$const8 = -2{,}5933$

$const9 = 0{,}8738$

$p = -2{,}2356$
$q = 1{,}2495$

$const10 = 0{,}3757$
$const11_a = -1{,}1178$
$const11_b = 1{,}1178$

$wlp9 = -0{,}40$
$wlp10 = +1{,}0166$