

**Transformacja
met. Helmerta**

x1	y1	x2	y2
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Punkty dostosowania

1	5856,43	4193,45	34804,86	43569,9
2	4500,95	5852,52	33376,42	45166,57
3	646,74	3746,1	29620,48	42889,6
Sumy	=SUMA(C5:C7)	=SUMA(D5:D7)	=SUMA(E5:E7)	=SUMA(F5:F7)

Bieguny S	X1s	Y1s	X2s	Y2s
	=C8/3	=D8/3	=E8/3	=F8/3

	dx1	dy1	dx2	dy1	s1
Przyrosty od biegunów	1 =C5-C\$10	=D5-D\$10	=E5-E\$10	=F5-F\$10	=C12*(F12-D12)
	2 =C6-C\$10	=D6-D\$10	=E6-E\$10	=F6-F\$10	=C13*(F13-D13)
	3 =C7-C\$10	=D7-D\$10	=E7-E\$10	=F7-F\$10	=C14*(F14-D14)
sumy	=SUMA(C12:C14)	=SUMA(D12:D14)	=SUMA(E12:E14)	=SUMA(F12:F14)	=SUMA(G12:G14)

Współczynniki

T1	=(G15-H15)/K15
Z1	=(I15+J15)/K15
X01	=E10-C10+D10*C17-C10*C18
Y01	=F10-D10-C10*C17-D10*C18

Punkty przeliczane

1	4567,89	1234,56	=C28-D28*\$C\$17+C28*\$C\$18+\$C\$19	=D28+C28*\$C\$17+D28*\$C\$18+\$C\$20
2	5856,43	4193,45	=C29-D29*\$C\$17+C29*\$C\$18+\$C\$19	=D29+C29*\$C\$17+D29*\$C\$18+\$C\$20
3	4500,95	5852,52	=C30-D30*\$C\$17+C30*\$C\$18+\$C\$19	=D30+C30*\$C\$17+D30*\$C\$18+\$C\$20
4	2831,21	5210,47	=C31-D31*\$C\$17+C31*\$C\$18+\$C\$19	=D31+C31*\$C\$17+D31*\$C\$18+\$C\$20
5	646,74	3746,1	=C32-D32*\$C\$17+C32*\$C\$18+\$C\$19	=D32+C32*\$C\$17+D32*\$C\$18+\$C\$20
6	1925,92	1529,76	=C33-D33*\$C\$17+C33*\$C\$18+\$C\$19	=D33+C33*\$C\$17+D33*\$C\$18+\$C\$20

s2	s3	s4	sm
=D12*(E12-C12)	=C12*(E12-C12)	=D12*(F12-D12)	=C12*C12+D12*D12
=D13*(E13-C13)	=C13*(E13-C13)	=D13*(F13-D13)	=C13*C13+D13*D13
=D14*(E14-C14)	=C14*(E14-C14)	=D14*(F14-D14)	=C14*C14+D14*D14
=SUMA(H12:H14)	=SUMA(I12:I14)	=SUMA(J12:J14)	=SUMA(K12:K14)

Wzory obliczeń

$$s1=s1+dx1*(dy2-dy1);$$

$$// s1=[dx1*(dy2-dy1)]$$

$$s2=s2+dy1*(dx2-dx1);$$

$$// s2=[dy1*(dx2-dx1)]$$

$$sm=sm+dx1*dx1+dy1*dy1;$$

$$// sm=[dx1^2+dy1^2]$$

$$s3=s3+dx1*(dx2-dx1);$$

$$// s3=[dx1*(dx2-dx1)]$$

$$s4=s4+dy1*(dy2-dy1);$$

$$// s4=[dy1*(dy2-dy1)]$$

$$sdx1=sdx1+dx1;$$

$$// [dx1]$$

$$sdy1=sdy1+dy1;$$

$$// [dy1]$$

$$sdx2=sdx2+dx2;$$

$$// [dx2]$$

$$sdy2=sdy2+dy2;$$

$$// [dy2]$$

$$T1 = (s1 - s2) / sm;$$

$$Z1 = (s3 + s4) / sm;$$

$$X01 = x2s - x1s + y1s*t1 - x1s*z1;$$

$$Y01 = y2s - y1s - x1s*t1 - y1s*z1;$$

Przeliczenie współrzędnych

$$X3 = X1 - Y1*T1 + X1*Z1 + X01 = X01 + (1+Z1)*X1 - T1*Y1$$

$$Y3 = Y1 + X1*T1 + Y1*Z1 + Y01 = Y01 + (1+Z1)*Y1 + T1*X1$$