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Theoretical trajectory 1

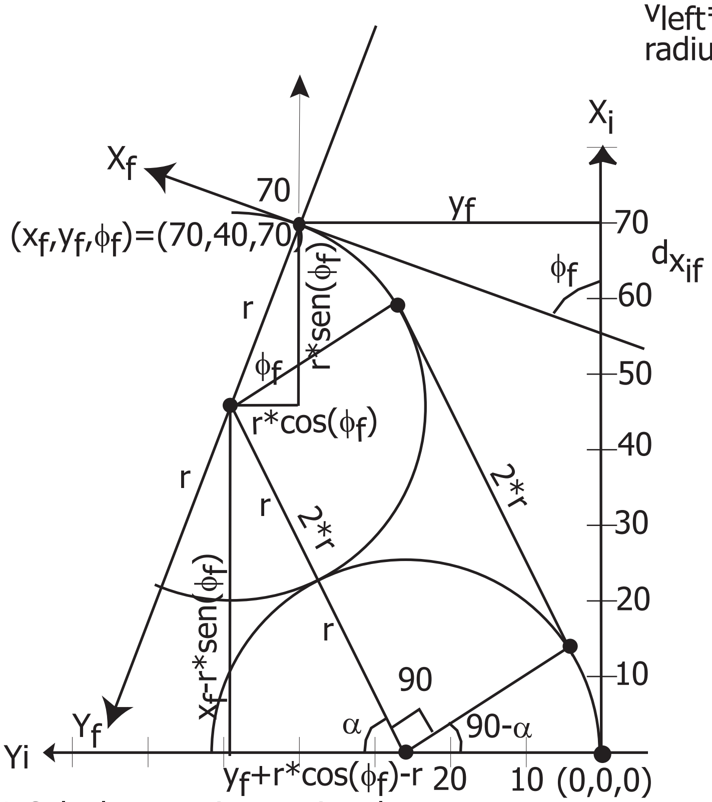
Consider a goal point (x_f,y_f,f_f) where x_f>y_f. When a straight line intersects both (x_f,y_f) with angle ϕ_f and the axis x_i in a point value greater than zero, by other words (d_{xif}<=x_f).

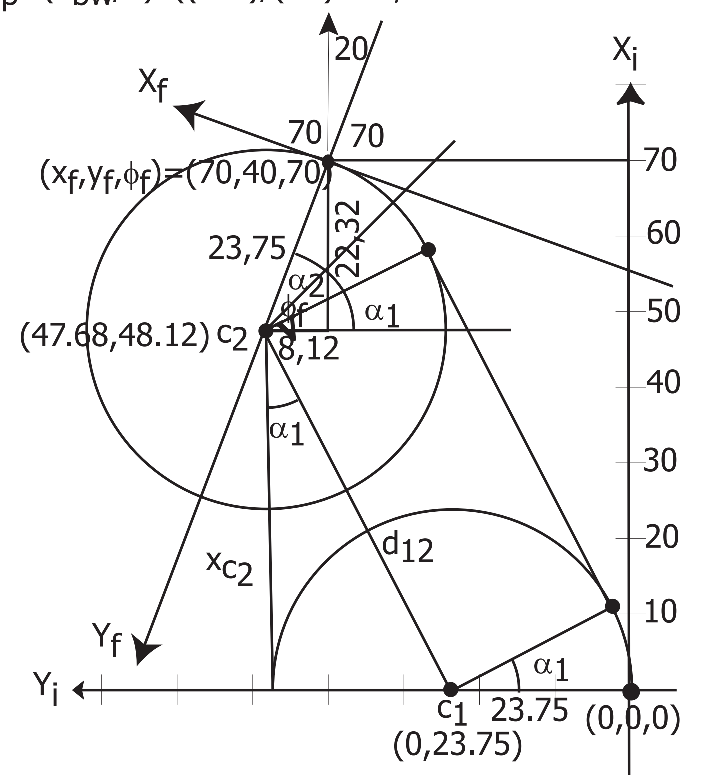
The theoretical trajectory can be,

curveLeft(r, 90-α)
straight(2*r),
curveLeft(r, ϕ_f-(90-α)).

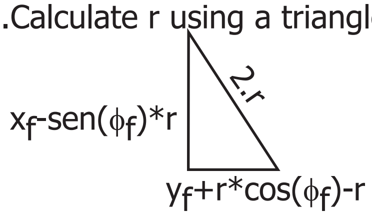
Practical Trajectory 1

Considering d_{bw}=9,5cm, v_{robot}=40, v_{min}=20, v_{max}=80, f>1 and $radius_t$=25,68cm then the theoretical left velocity is:
f=(25,68+4,75)/(25,68-4,75)=1,454,
v_{left}=2/(2,454)*40=32,60
Then, the practical values are:
v_{left}=32, v_{right}=48, f=1,5,
$radius_p$=(d_{bw}/2)*((f+1)/(f-1)=23,75cm





1.Calculate r using a triangle,



by pitagoras theorem,
$(2*r)^2=(x_f-sen(\phi_f)*r)^2+(y_f+(cos(\phi_f)-1)*r)^2$,

the coeficients of resolvent formula are,
a=2+2*cos(ϕ_f) ; b= 2*y_f*(1-cos(ϕ_f))+ 2*x_f*sen(ϕ_f);
c= -($x_f^2+y_f^2$)

using these coeficients in a resolvent formula, we get r=25.68

2. Calculate angle α
sen(α)= (x_f-r*sen(ϕ_f))/2*r
α= arcsen((x_f-r*sen(ϕ_f))/2*r)
in example, a= 63,27.

3. The theoretical trajectory is,
curveLeft(25.68, 26.73),
straight(51.36),
curveLeft(25.68, 43.27).

1. Calculate c2 with r=23,75 and (70,40,70),
x_{c2}= x_f-r*sen(ϕ_f)= 70-22,32=47,68,
y_{c2}= y_f+r*cos(ϕ_f)= 40+8,12=48,12.

2. Calculate distance d_{12} between c_1 and c_2,
d_{12}= $((x_{c1}-x_{c2})^2 + (y_{c1}-y_{c2})^2)^{0,5}$
d_{12}= 53,55

3. Calculate α_1 and α_2,
α_1=arc cos(x_{c2}/d_{12})= 27,08
α_2= ϕ_f-α_1 = 42,92

4. The practical trajectory is,
curveLeft(23.75, 27.08),
straight(53.55),
curveLeft(23.75, 42.92).