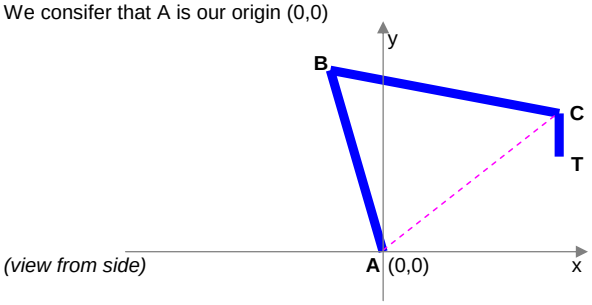
2D / 3DOF Inverse Kinematics

We know the lenghts of AB,BC,CT
We know the Target coordinates T(x,y)
We choose the angle CT makes with the origin (t_angle)
We consifer that A is our origin (0,0)



start with calculating the position of C
C(x)=Tx+CT*cos(t_angle)
C(y)=Ty+CT*sin(t_angle)

now work on the ABC triangle

calculate the length of AC using the hypotenuse
AC=sqr(Cx²+Cy²) *BS2 code : AC = Cx HYP Cy*

and the angle AC is making with the x axis (ac_angle)
ac_angle=atan(Cy/Cx) *B2 code : ac_angle = Cx ATAN Cy*

with the 3 lenghts of a triangle, we can calculate all its angles
by using the law of sines http://en.wikipedia.org/wiki/Law_of_sines
that says sin(A)/BC = sin(B)/AC = sin(C)/AB = AB*BC*AC/2S

S is the surface of ABC, we can use Heron's formula
S=sqr(s*(s-AB)(s-BC)(s-AC))

s is the semiperimeter of ABC
s=(AB+BC+AC)/2

start from the end… calculate s then S

the law of sines gives us sin(A) = 2S/(AB*AC)
A=asin(2S/(AB*AC))
B=asin(2S/(AB*BC))
C=asin(2S/(AC/BC))

now go out of this ABC triangle to have the SERVO angles
servo_A = ac_angle + A
servo_B = B
servo_C = t_angle - servo_B - servo_A

That's all folks !