% Script to determine path and plot points of path for "StickyBotIII" based

% on known link size relationships

% Created by: Yifan Ge, Jordan Rivera, Stasia Schlatter

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% Establish known variables

F = 10; % Scaling factor for all lengths used below (r1 -5, x, y)

r1 = F \* 2; % Length of ground link between r2 & r5

r2 = F \* 1.3; %

r3 = F \* 3; %

r4 = F \* 3; %

r5 = F \* 3.3; %

x = F \* 2; % Distance from intersection of r3 & r4 to point P

y = F \* 4.8; % Distance from intersection of r2 & r3 to point P

r = [r1, r2, r3, r4 ,r5, x, y];

theta1 = pi/2; % angle of ground link from horizontal

%%

clf

speed = input('Please enter the plotting speed (1-10): ','s');

step = str2double(speed)/100;

% Ask for limit on theta4

response4 = input('Please enter theta 4 limit in degree: ', 's');

degree4 = str2num(response4);

limit4 = degree4\*pi/180;

theta4Lim = limit4(1):step:limit4(2);

% Ask for limit on theta2

response2 = input('Please enter theta 2 limit: ', 's');

degree2 = str2num(response2);

limit2 = degree2\*pi/180;

theta2Lim = limit2(1):step:limit2(2);

hf = axes; % Declare the handle

g = line; % Line for the trace of the point of interest

% set the axes with x and y limits

set(hf, 'XLim',[-80,10],'YLim', [-10,80]);

axis equal

axis manual

grid on

title('Five bar simulation of StikyBotIII');

xlabel('x');

ylabel('y');

P2 = [0 ; r1]; % R1 with xi, xf, yi, yf in a matrice

P4 = [0 ; 0];

l1 = line([0,0], [0,r1],'color',...

[.4 .4 .8],'LineWidth',3);

% Defines the fixed R1

hold on

%%

% Define all the initial vectors

theta4 = limit4(1);

theta2 = limit2(1);

[P3, P5, Px, Py, P] = getParameter(theta2, theta4, r);

Pl = P;

defect = 0;

l2 = line([P2(1), P3(1)], [P2(2), P3(2)],'color',...

[.4 .4 .8],'LineWidth',3);

l3 = line([P3(1), Px(1)], [P3(2), Px(2)],'color',...

[.4 .4 .8],'LineWidth',3);

l5 = line([P5(1), Px(1)], [P5(2), Px(2)],'color',...

[.4 .4 .8],'LineWidth',3);

l4 = line([P4(1), P5(1)], [P4(2), P5(2)],'color',...

[.4 .4 .8],'LineWidth',3);

lx = line([Px(1), P(1)], [Px(2), P(2)],'color',...

[.4 .4 .8],'LineWidth',3);

ly = line([Py(1), P(1)], [Py(2), P(2)],'color',...

[.4 .4 .8],'LineWidth',3);

% Draw the graph

for k = 1:length(theta4Lim)

theta4 = theta4Lim(k);

for j = 1:length(theta2Lim)

set(g,'XData',Pl(1,:),'YData',Pl(2,:));

theta2 = theta2Lim(j);

[P3, P5, Px, Py, P] = getParameter(theta2, theta4, r);

defect = isDefected(P3,Px,Py,P,r);

if (defect == 0)

set(l2,'XData',[P2(1), P3(1)],'YData',[P2(2), P3(2)]);

set(l3,'XData',[P3(1), Px(1)],'YData',[P3(2), Px(2)]);

set(l5,'XData',[P5(1), Px(1)],'YData',[P5(2), Px(2)]);

set(l4,'XData',[P4(1), P5(1)],'YData',[P4(2), P5(2)]);

set(lx,'XData',[Px(1), P(1)],'YData',[Px(2), P(2)]);

set(ly,'XData',[Py(1), P(1)],'YData',[Py(2), P(2)]);

Pl = cat(2,Pl,P);

drawnow

end

end

end