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Code and Graphs:

r2=12;

r3=34;

r4=0; %dimensions are in cm

w=120; %w is in rad/s

t=linspace(0, (2\*pi)/w, 1000);

th1=0;

th4=0;

th2=w\*t; %input displacement

b=((2\*r4\*cos(th1-th4))-(2\*r2\*cos(th1-th2)));

c=(-(2\*r4\*r2\*cos(th2-th4))+power(r2,2)+power(r4,2)-power(r3,2));

r1=(-b+sqrt(power(b,2)-(4\*c)))/2;

v=diff(r1) ./ diff(t); %linear velocity of the slider

v=[v, v(end)];

a=diff(v) ./ diff(t); %linear accelaration of the slider

a=[a, a(end)];

th3=atan2(((r1\*sin(th1))+(r4\*sin(th4))-(r2\*sin(th2))),((r1\*cos(th1))+(r4\*cos(th4))-(r2\*cos(th2)))); %output displacement

v2=diff(th2) ./ diff(t); %input velocity

v2 = [v2, v2(end)];

v3=diff(th3) ./ diff(t); %output velocity

v3 = [v3, v3(end)];

a2=diff(v2) ./ diff(t); %input accelaration

a2=[a2, a2(end)];

a3=diff(v3) ./ diff(t); %output accelaration

a3=[a3, a3(end)];

plot(t,th2);

title('Kinematic Analysis of Slider Crank Mechanism');

xlabel('Time(seconds)');

ylabel('Input Displacement (cm)');

grid on;

plot(t,v2);

ylim([-150 150]);

title('Kinematic Analysis of Slider Crank Mechanism');

xlabel('Time(seconds)');

ylabel('Input Velocity (cm/s)');

grid on;

plot(t,a2);

ylim([-10 10])

title('Kinematic Analysis of Slider Crank Mechanism');

xlabel('Time(seconds)');

ylabel('Input Accelaration (cm/s^2)');

grid on;

plot(t,th3);

title('Kinematic Analysis of Slider Crank Mechanism');

xlabel('Time(seconds)');

ylabel('Output Displacement (cm)');

grid on;

plot(t,v3);

title('Kinematic Analysis of Slider Crank Mechanism');

xlabel('Time(seconds)');

ylabel('Output Velocity (cm/s)');

grid on;

plot(t,a3);

title('Kinematic Analysis of Slider Crank Mechanism');

xlabel('Time(seconds)');

ylabel('Output Accelaration (cm/s^2)');

grid on;

plot(t, r1);

title('Kinematic Analysis of Slider Crank Mechanism');

xlabel('Time(seconds)');

ylabel('Slider Displacement (cm)');

grid on;

plot(t,v);

title('Kinematic Analysis of Slider Crank Mechanism');

xlabel('Time(seconds)');

ylabel('Slider Velocity (cm/s)');

grid on;

plot(t,a);

title('Kinematic Analysis of Slider Crank Mechanism');

xlabel('Time(seconds)');

ylabel('Slider Accelaration (cm/s^2)');

grid on;





