Homework 2, Task 1:

Tools: Calculator suite - GeoGebra

Link to the simulation: https://www.geogebra.org/calculator/zsgwdfre

Task description:

Task 1 (Coding)

You should find:

1. simulate this mechanism (obtain all positions.)
2. velocities and accelerations for *A, B, C, E, F, D.*
3. draw plots: speed and acceleration *B, C, F, E*; angular speed and angular acceleration *CD, CO_2, DO_3.*

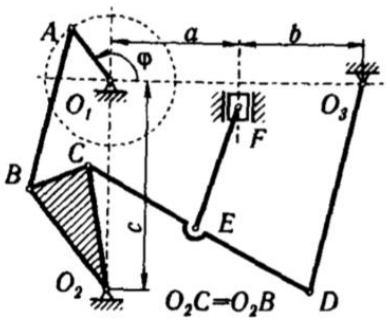
Needed variables:

$\omega_{O_1A} = 2\ rad/s$;

$\phi = 130°$; $a = 31$; $b = 30$; $c = 50$;

$O_1A = 15$; $O_2B = 30$; $O_3D = 50$; $AB = 40$; $BC = 16$;

$CD = 60$; $CE = 30$; $EF = 30$..



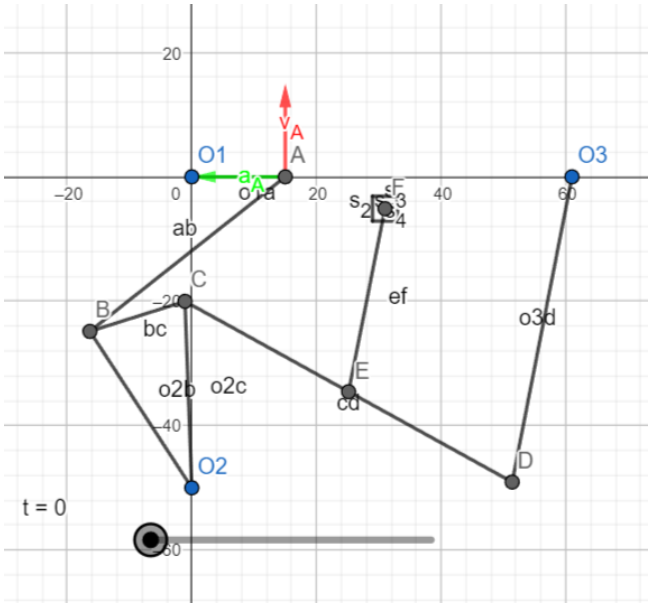
Task 1
(Yablonskii (rus) K4)

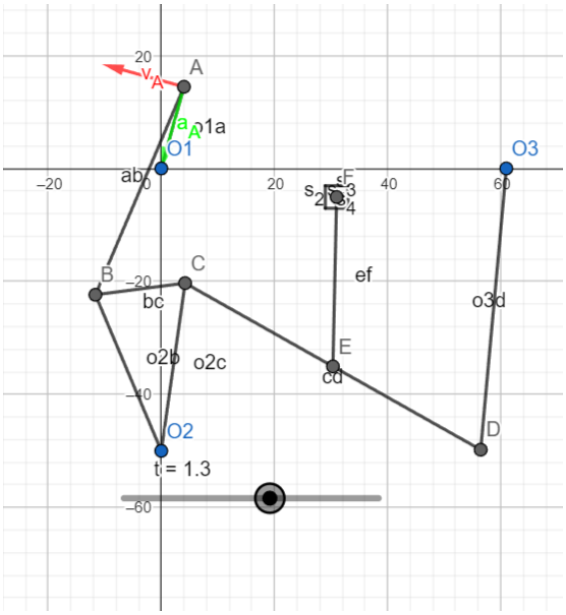
Task explanation:

Firstly, we create O1, O2 and O3. After that we start from point A, make it move around O1 with radius = 15. Then we calculate at which time A will reach point of angle phi and make it the highest value of t. Then we realize, that O2B=O2C=30. That means that both of these points are placed on a circle with center point being O2 and radius = 30. We know the distance between points A and B, so I make 2 circles, around point A and around point O2 and search for their intersection points. One of them is point B. After that, we can find position of the point C relatively to the point B using cosine theorem. The same procedure as for point B is done for point D (two circles around C and O3). E – center point of CD. Then make a function for point F to move and then again, define the actual position of the point F and make box around it. After that we see that the whole model moves perfectly, so everything is at place.

Now let's move to the problems. I originally tried to do this problem in Python, but I ran into some problems and decided to turn back to the geogebra. Unfortunately, I didn't find any solution how to do angular speed, even ω_{O1A}, so I wasn't able to find any velocities nor accelerations of rigit bodies. Also due to the chosen method it was also impossible to find them for points (for point A velocity will be constant). Right now I'll try turn back to the Python and find another solution and if I will be able to do it on time I'll submit the better version. Sorry for such bald work.

Screenshots:





Meme of the week: