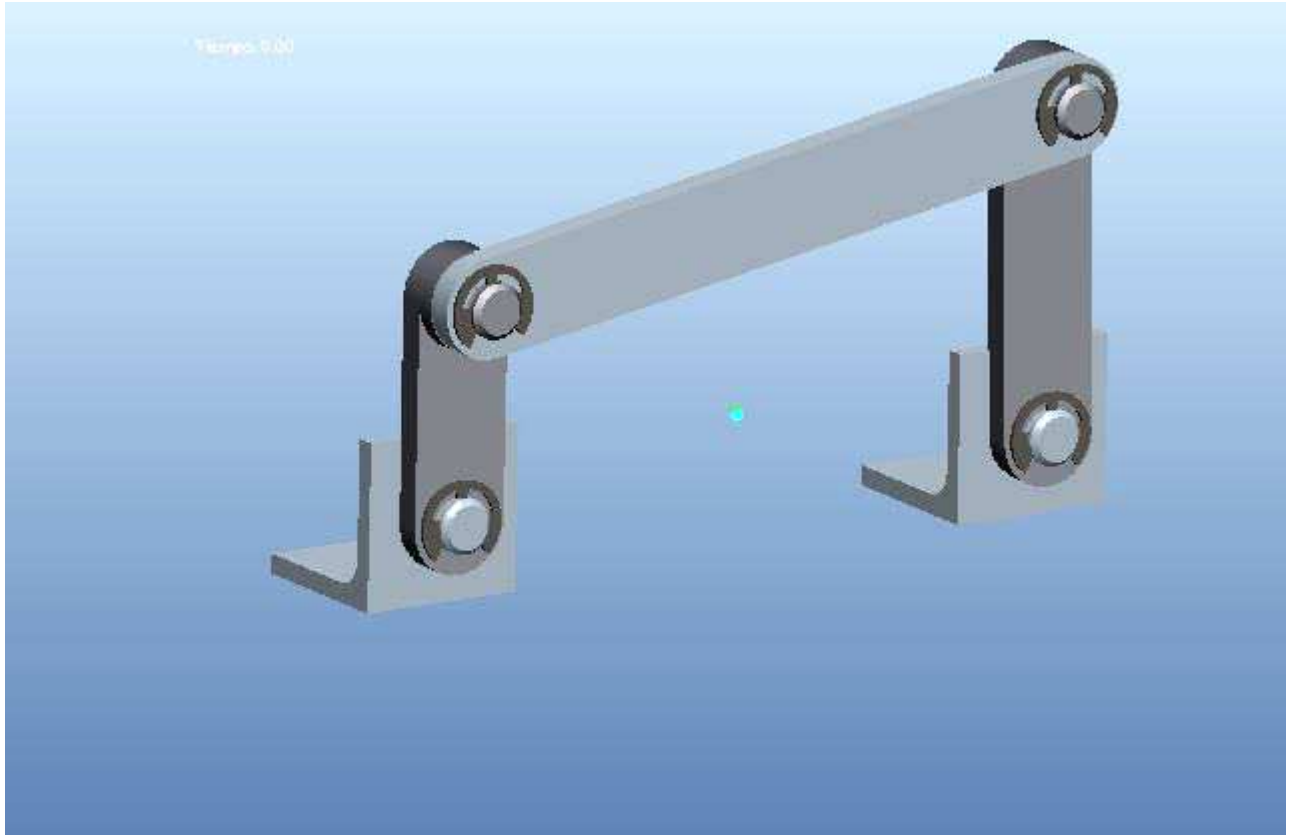
MACHINE THEORY
Bachelor in Mechanical Engineering

MECHANISMS SIMULATION

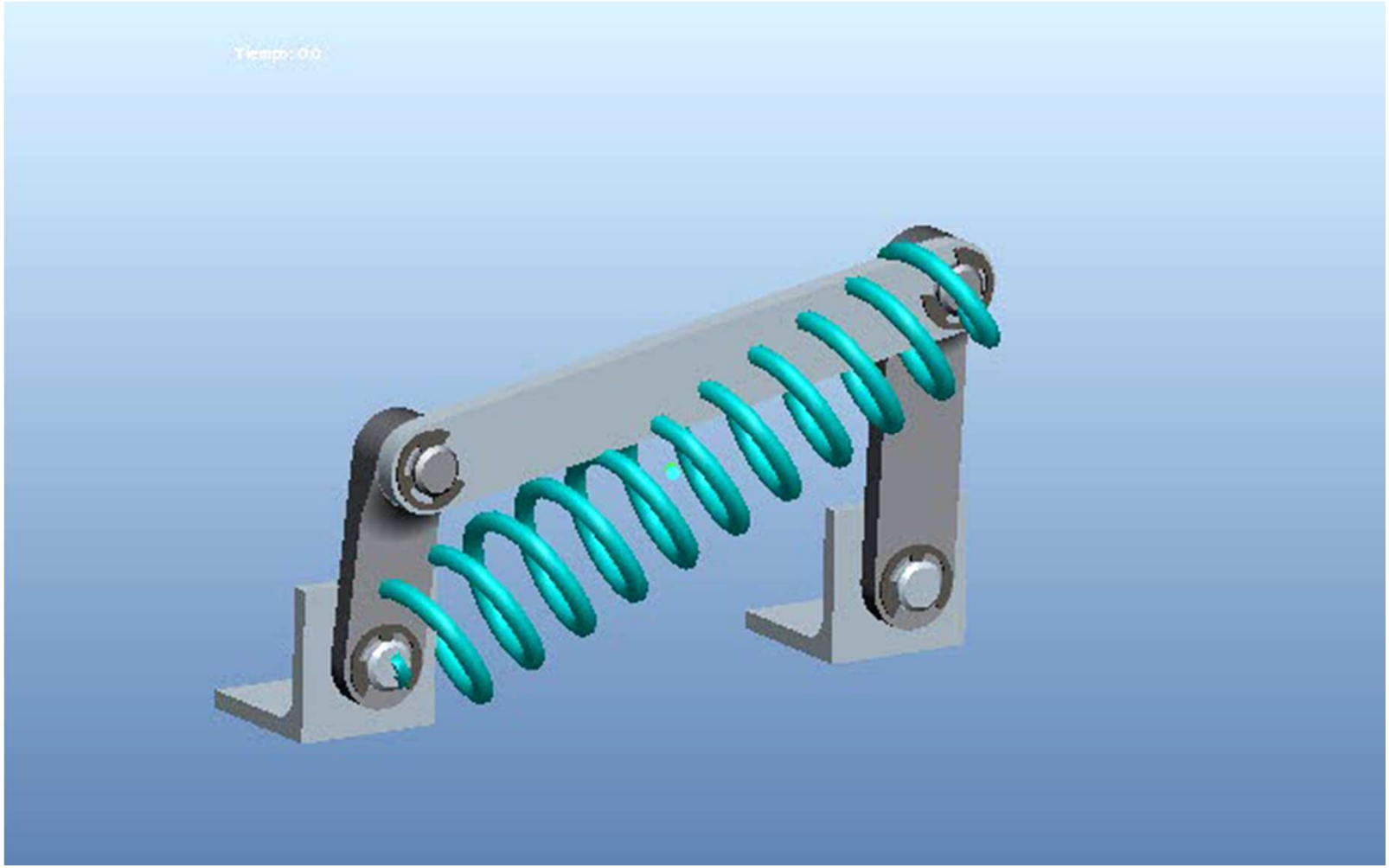
Mauricio Alba Lucero 2011

Universidad
Carlos III de Madrid

Objective

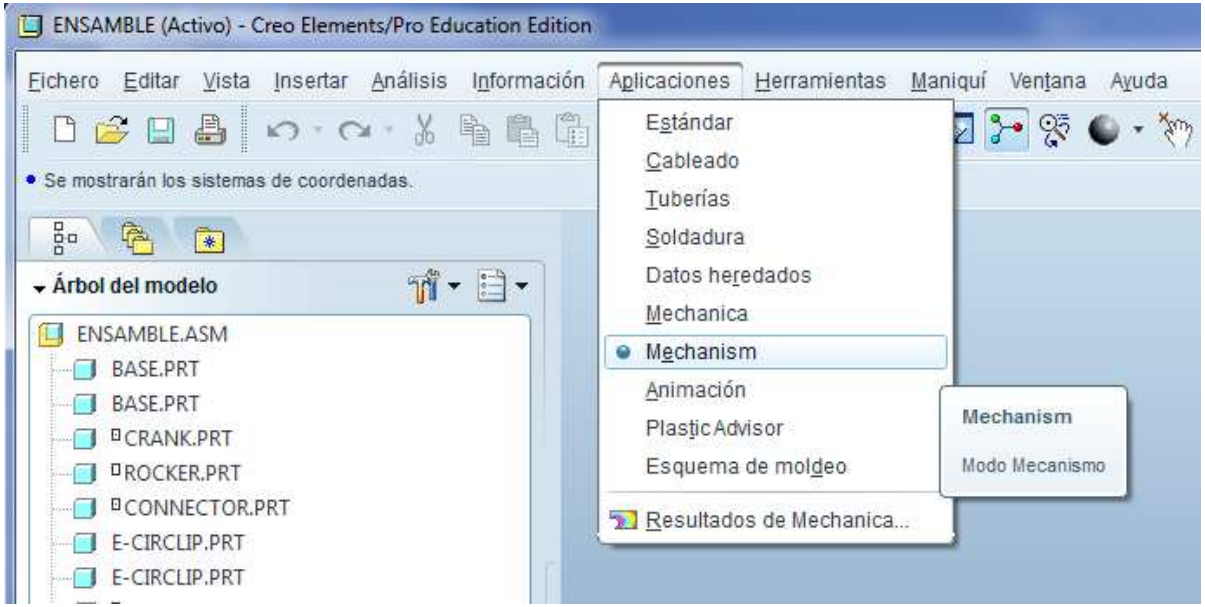


Objective



Early steps

- Download the parts from Aula Global
- Define working directory
- Open “ensamble.asm”
- Change to mechanism application



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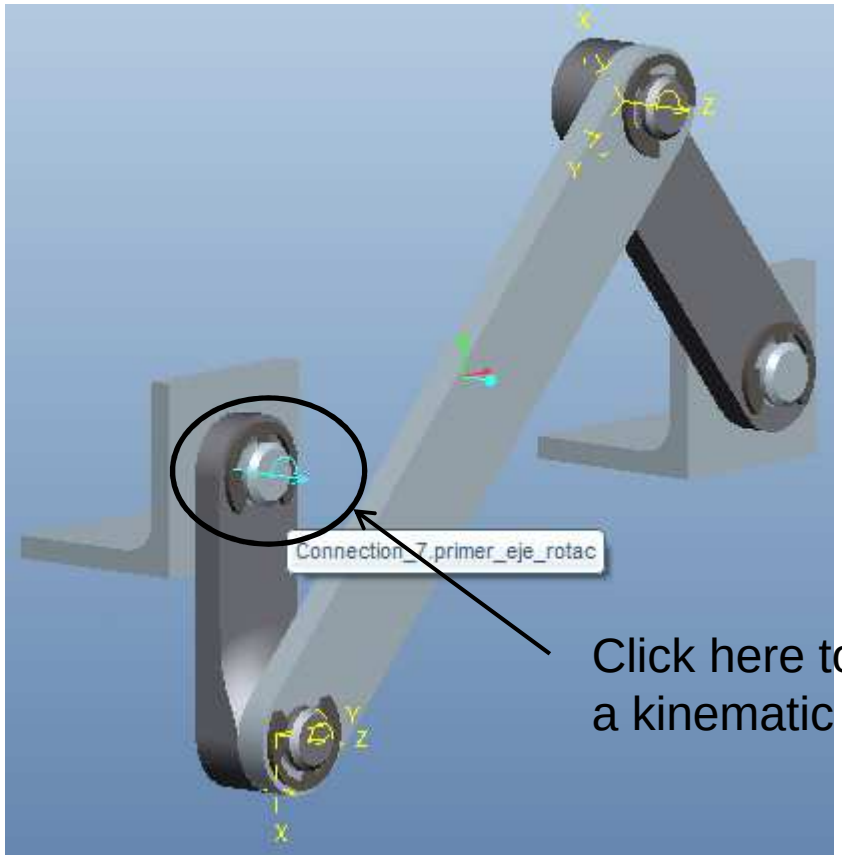
Add a kinematic motor



Click here to add
a kinematic motor

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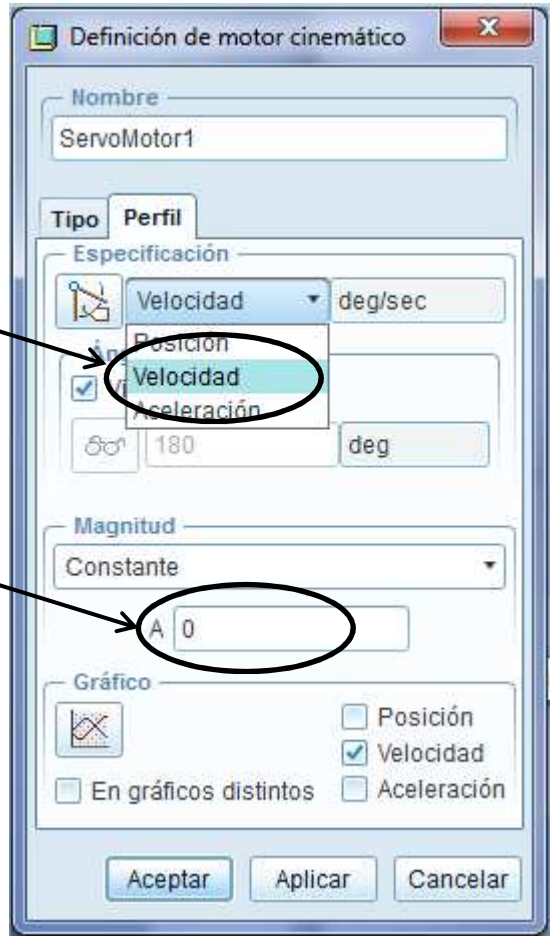
a kinematic motor

Define the type and parameters of the motor

Select the type of motor (Velocidad).

And define its magnitude as 40



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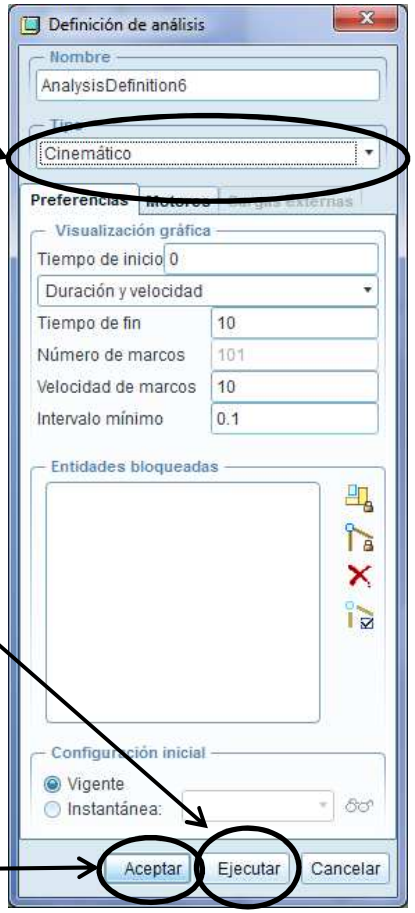
Perform the simulation

Click here to start the simulation

First, define the anaylsis to kinematic



Then click on “Ejecutar”

And finally “Aceptar”

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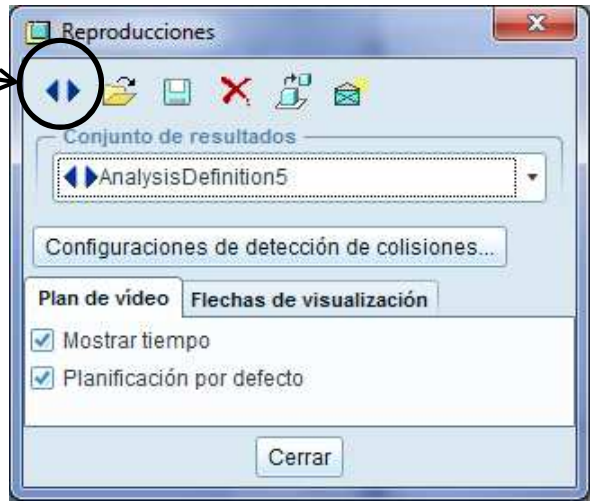
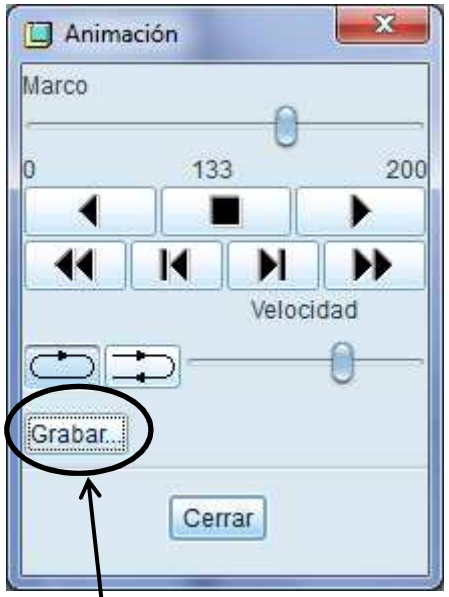
Visualize the results

To visualize the animation click here

And then click here





You can export the animation using this button.

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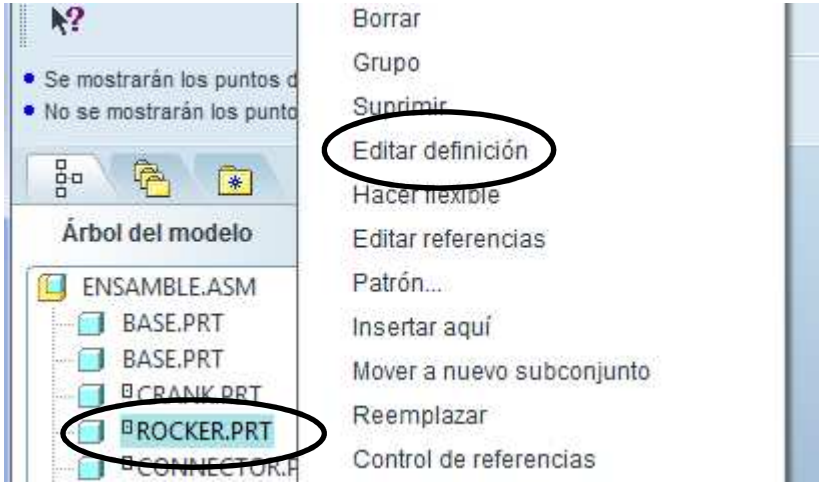
Prepare the model to be meassured

- In order to take measurements from the model, it is required that all the joints are defined as mechanism.
- Come back to the “Estándar” environment in the “Aplicaciones” menu.
- Edit the definition of the **rocker** and define all its connections as mechanism (This error was done on purpose).



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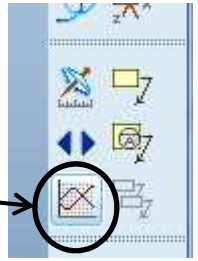
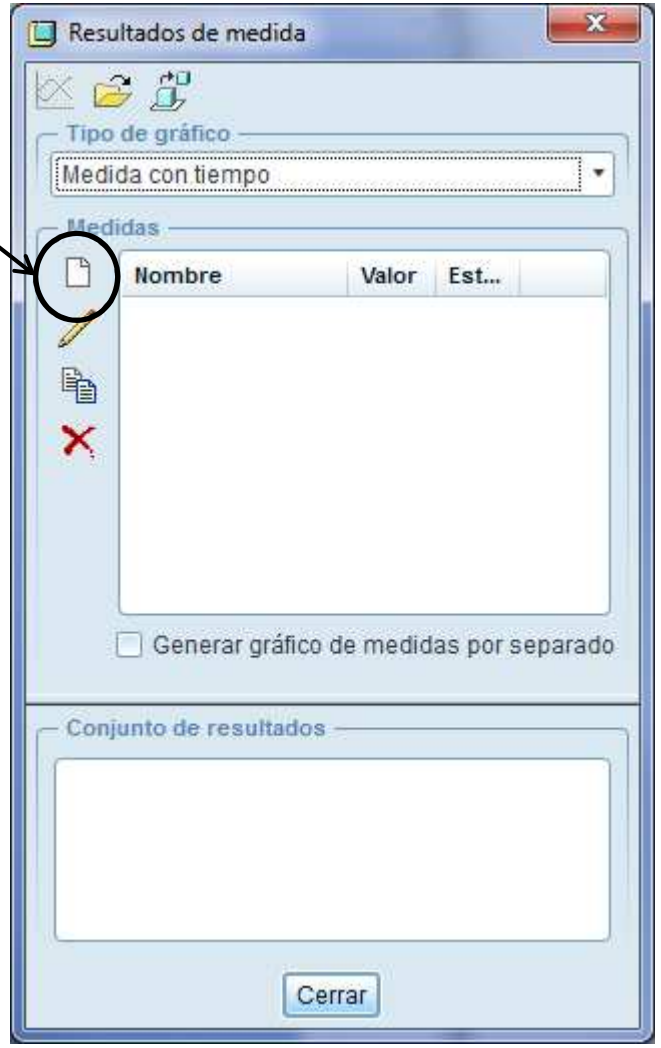
Define the parameters to measure

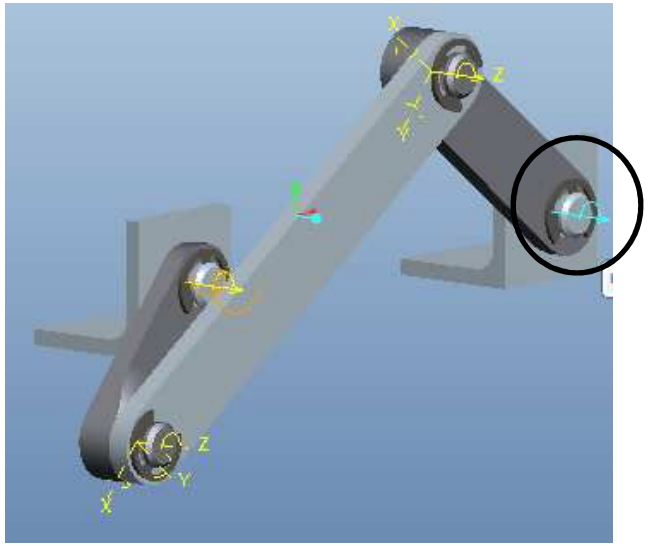
First, click here to define the measurements



Then, here to create the measurements



And finally, select this axis to create the measurement

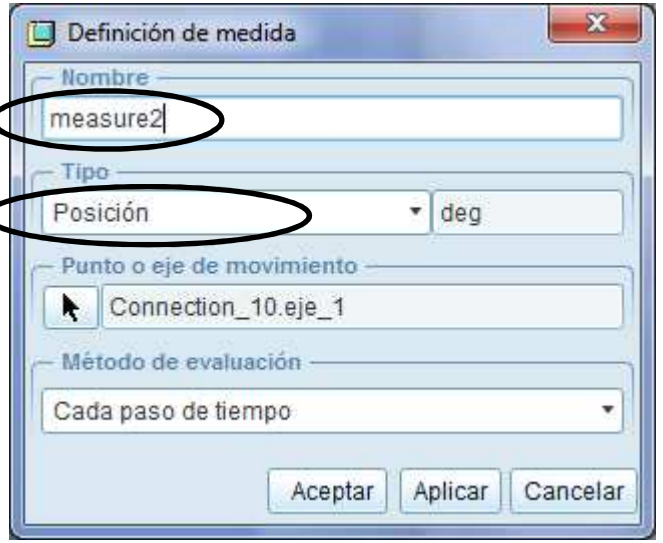


Define the parameters to measure

- Create 3 parameters by repeating the previous steps. The parameters are the position, velocity and acceleration.
- Run the simulation again by clicking on 

Define the right name to avoid confusions

And select the right type



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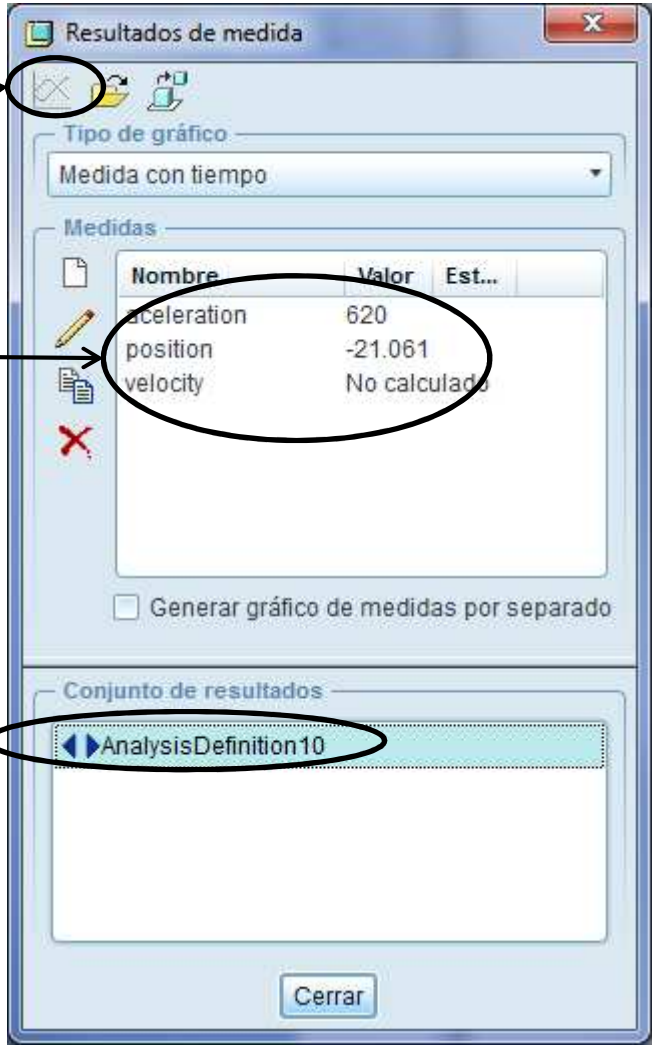
Visualize the results

And finally click on this button.

Then, select the variable or variables you want to visualize

First, click on the analysis you want to see the results



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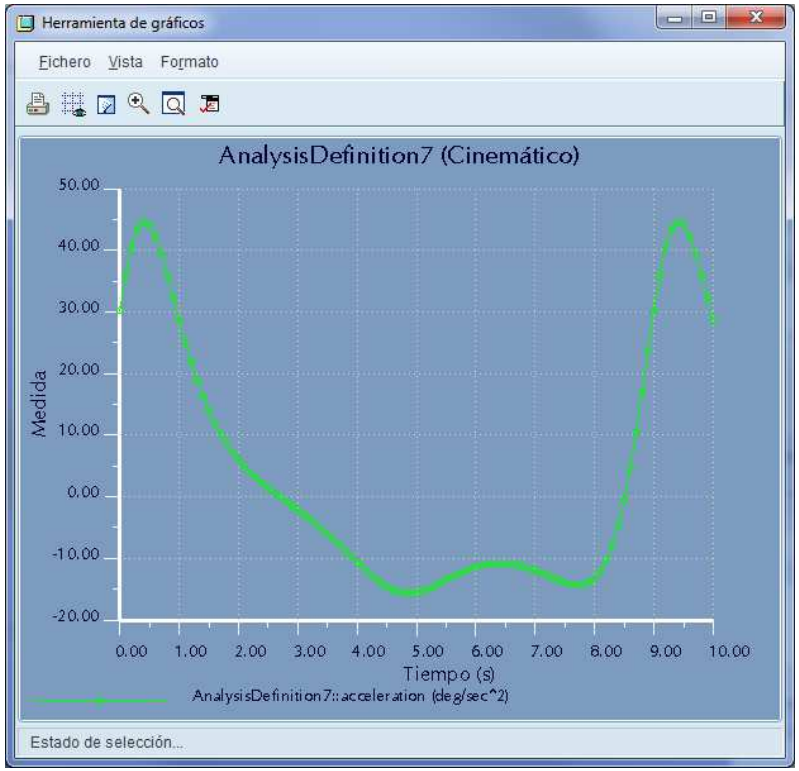
Visualize the results

- You can export the results to excel or text format. Just play with the menus to discover the possibilities.



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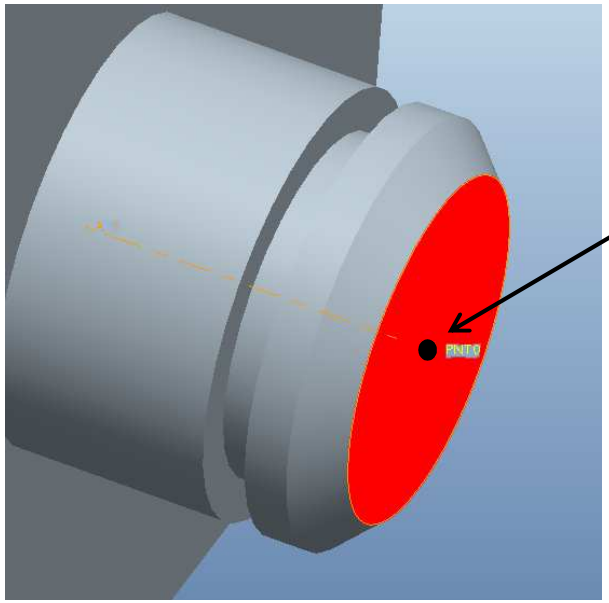
Perform a dynamic analysis

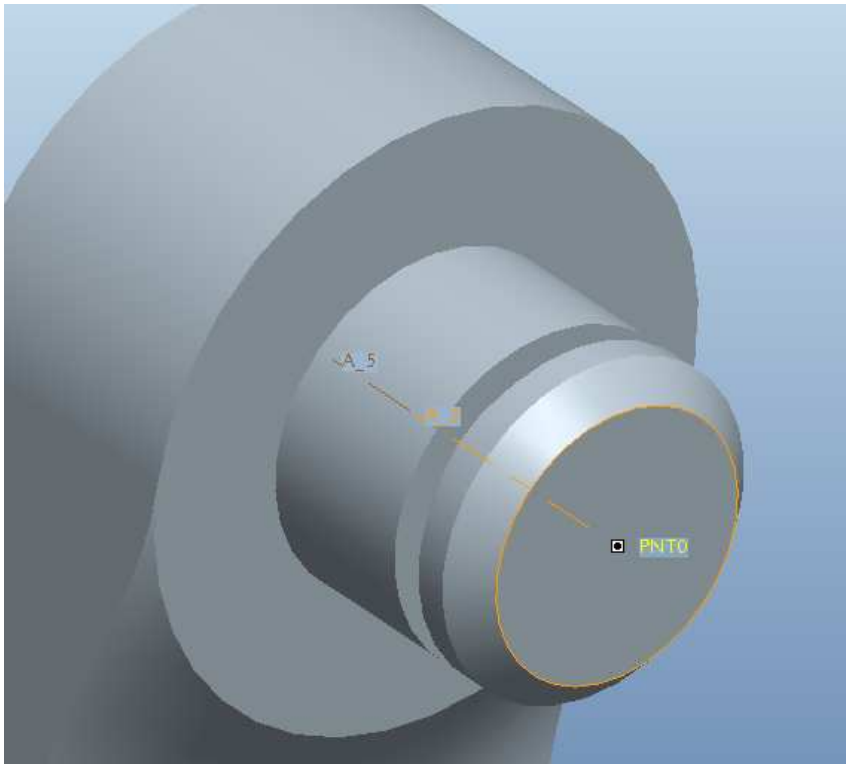
- Go to <file-save as> and save “assembly.asm” as “assem_dyn.asm”.
- Open base.prt and add a reference point by clicking over 
- When it is done, save and close this windows.



Use the intersection of the axis and the red face as references.
First click on the face, and then press control key and click on the axis.

Add more reference entities

- Repeat the process for the part “rocker.prt”.



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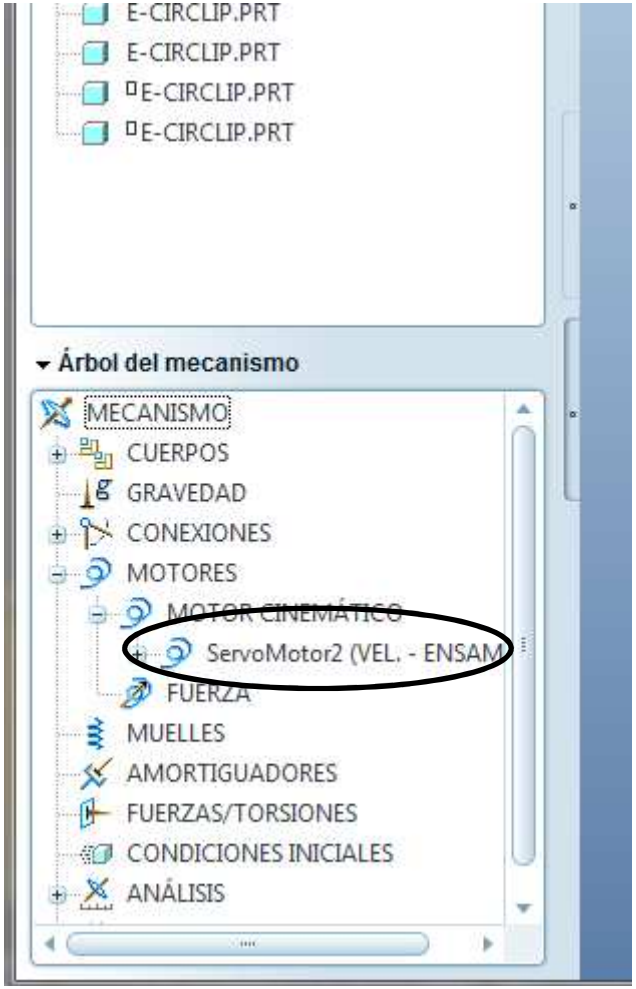
Add a spring

- Open asm_dyn.asm, go to the mechanism module and erase the kinematic motor by selecting it on the tree of the mechanism (Arbol del mecanismo) and then pressing delete button.



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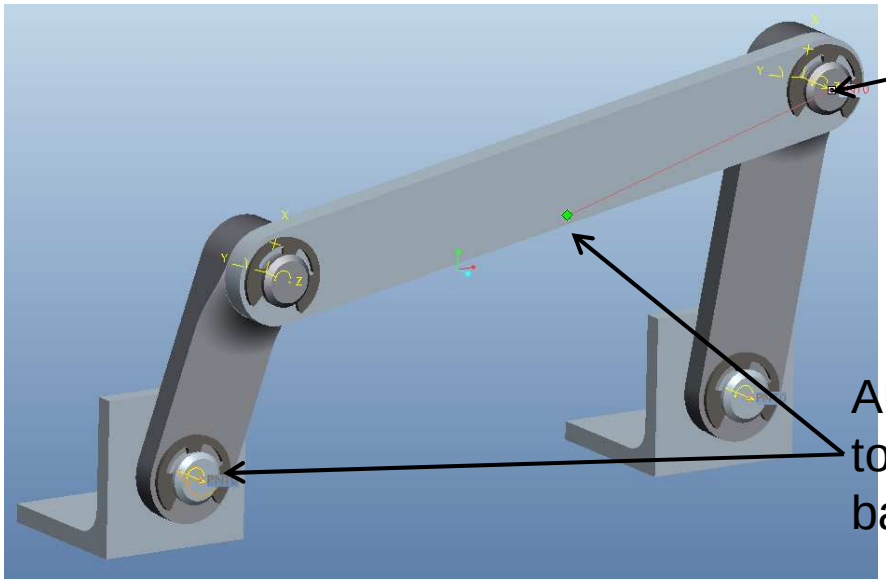
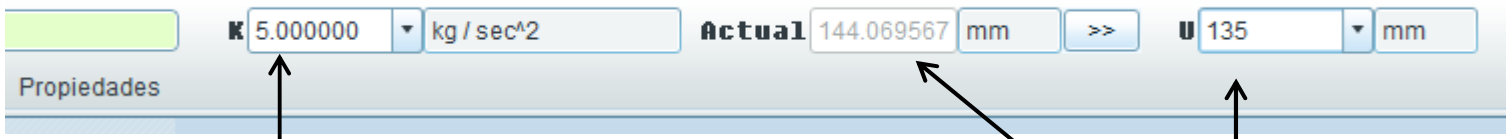
Add a spring



First click on the reference point of the rocker.

And then drag the green dot to the reference point of the base.



Insert 5 as stiffness coefficient

Insert approximately 10mm less than the actual distance

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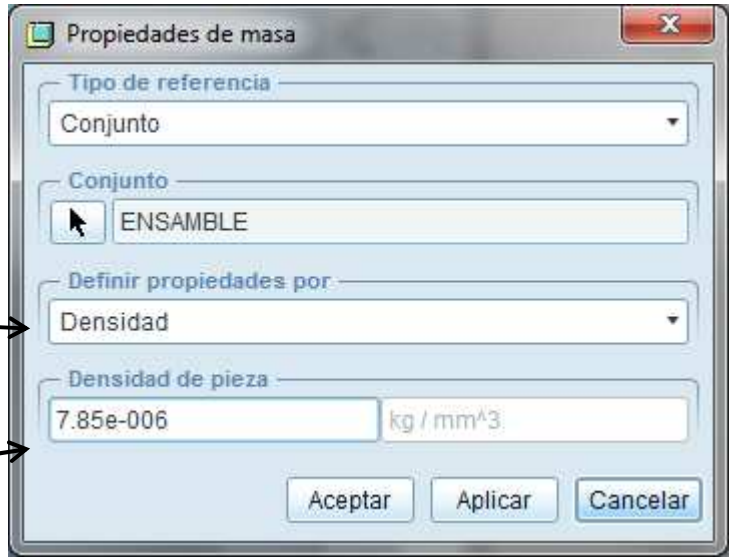
Add mass properties

Select “Conjunto” as reference type

Then define the properties using “Densidad”

And insert 7.85e-6



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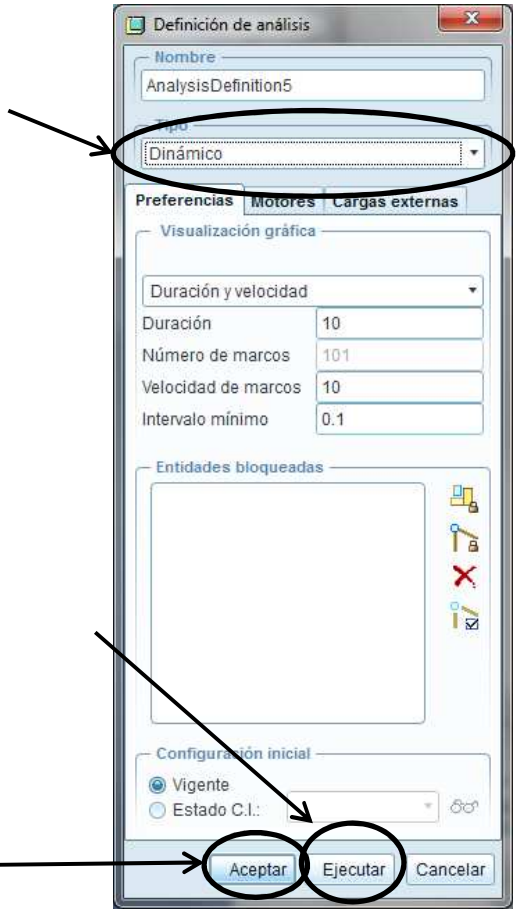
Perform the simulation

Click here to start the simulation

This time select “Dinámico” as the type of analysis



Then click on “Ejecutar”

And finally “Aceptar”

Enjoy the result!