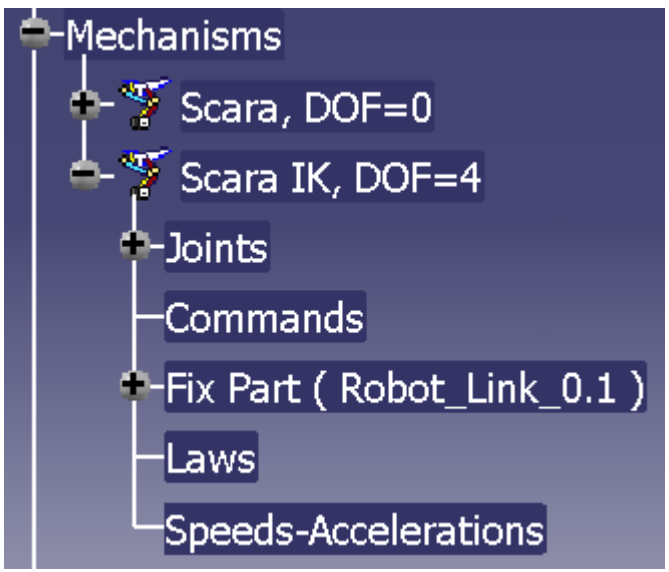
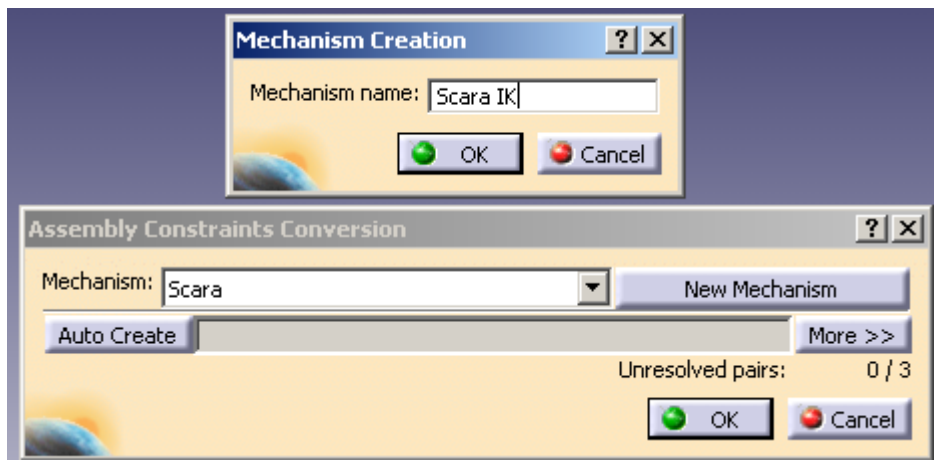
Move the end-effector

- Creating a virtual mechanism
  - Three orthogonal prismatic joints (X, Y, Z)
  - One revolute joint around Z axis
- Insert parts
  - X.CatPart,
  - XY.CatPart,
  - YZ.CatPart,
  - Z.CatPart
  - Rot_ZY.CatPart

Move the end-effector

- New mechanism: «Assembly constraints conversion»
  - Create a new mechanism from previous one
  - Change the name «Scara IK»
  - Use «Auto create» to use the previous joint definition

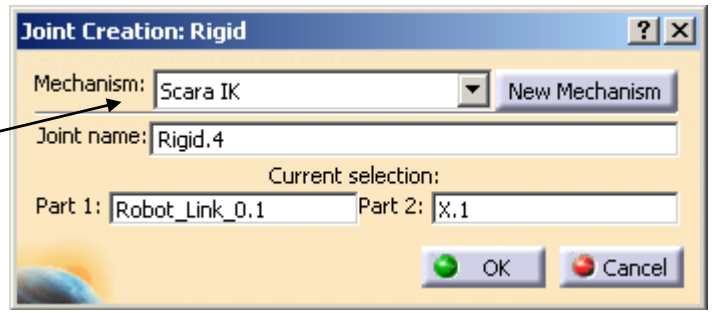




Move the end-effector

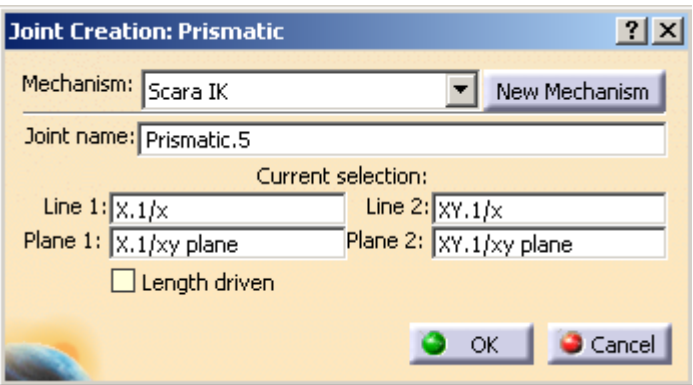
- Create a rigid joint between «Robot_link0» and «X»

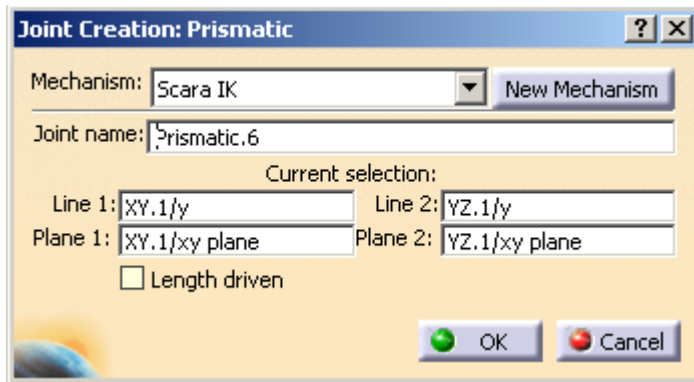
Change the mechanism!

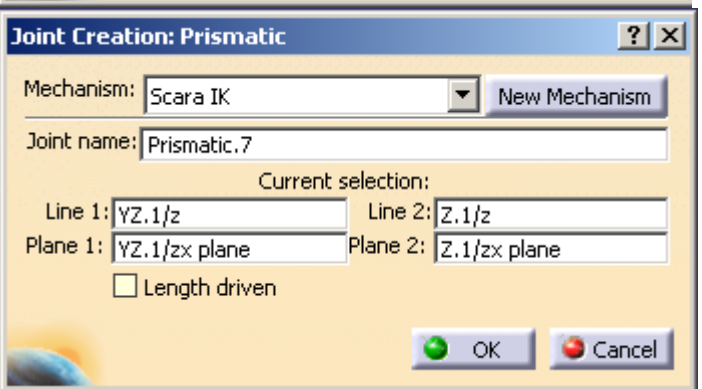


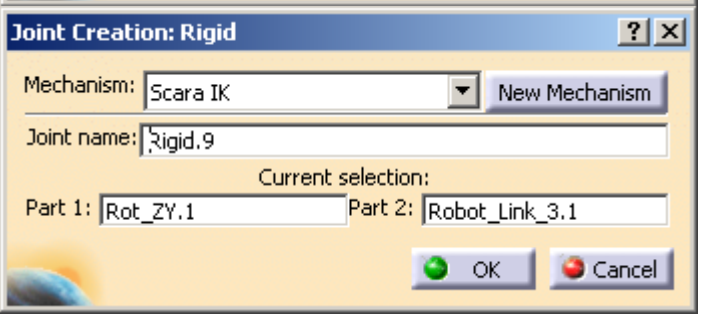
- Create three prismatic joint between
  - «X» and «XY»
  - «XY» and «YZ»
  - «YZ» and «Z»
- Create a revolution joint between «Z» and «Rot_ZY»
- Create a rigid joint between «Rot_ZY» and «Robot_link3»

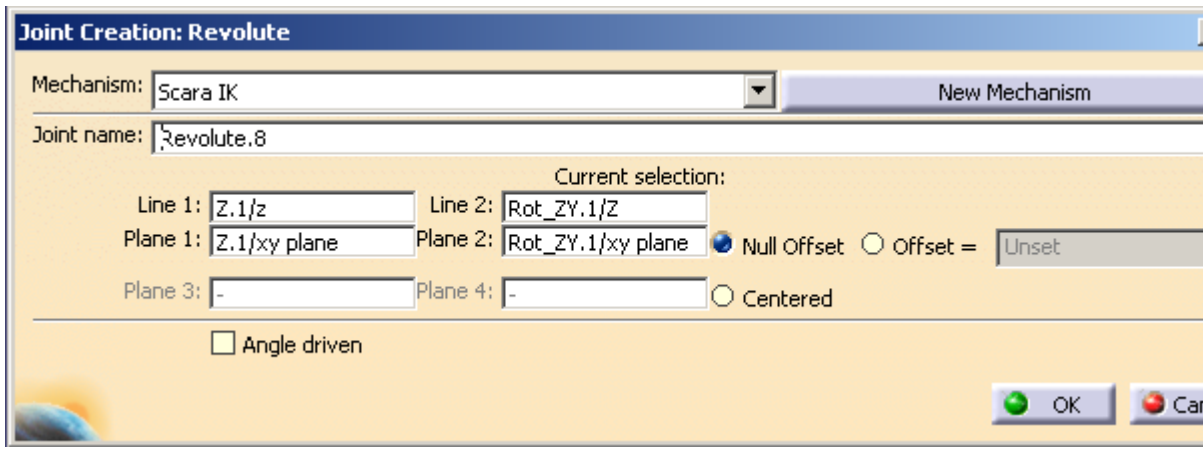
Move the end-effector





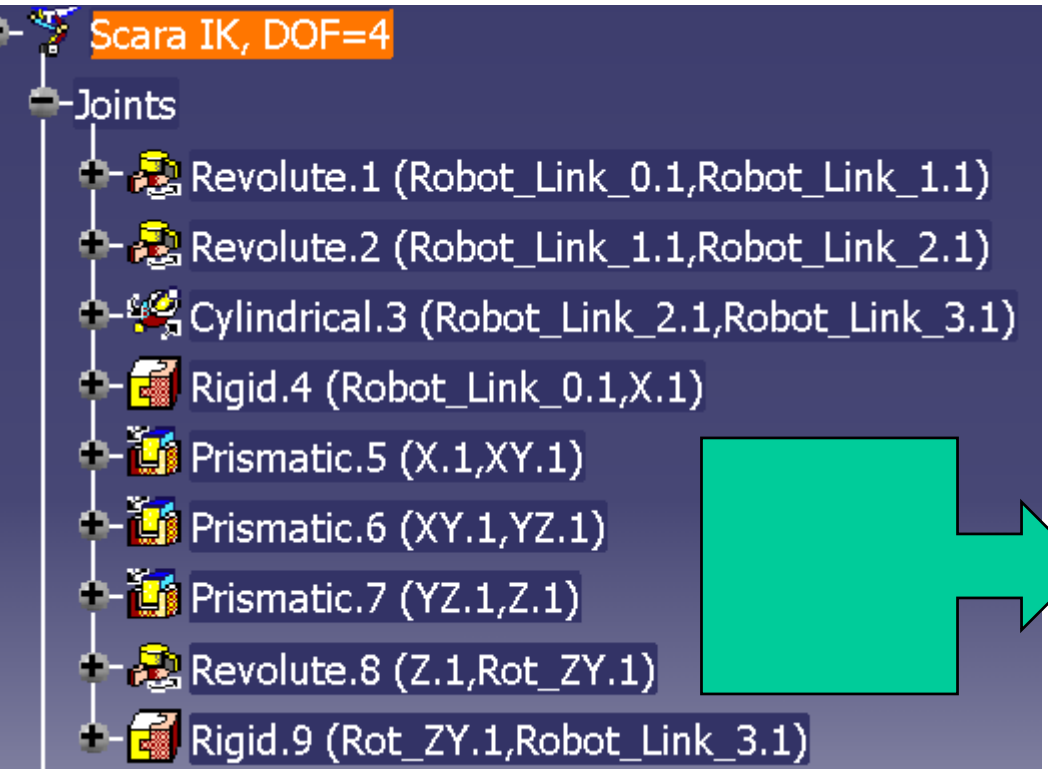






Move the end-effector

- Only 4 dof for the mechanism at the end

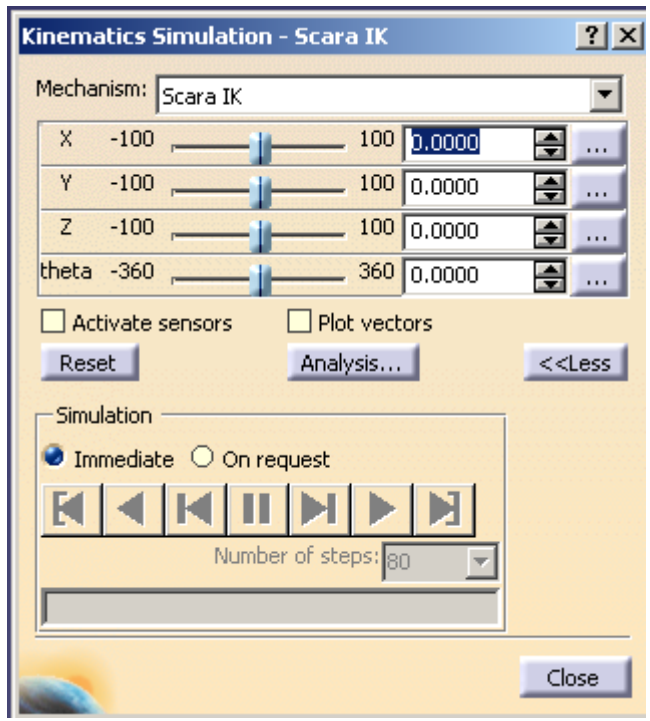


Add commands

- The mechanism can be simulated

Move the end-effector

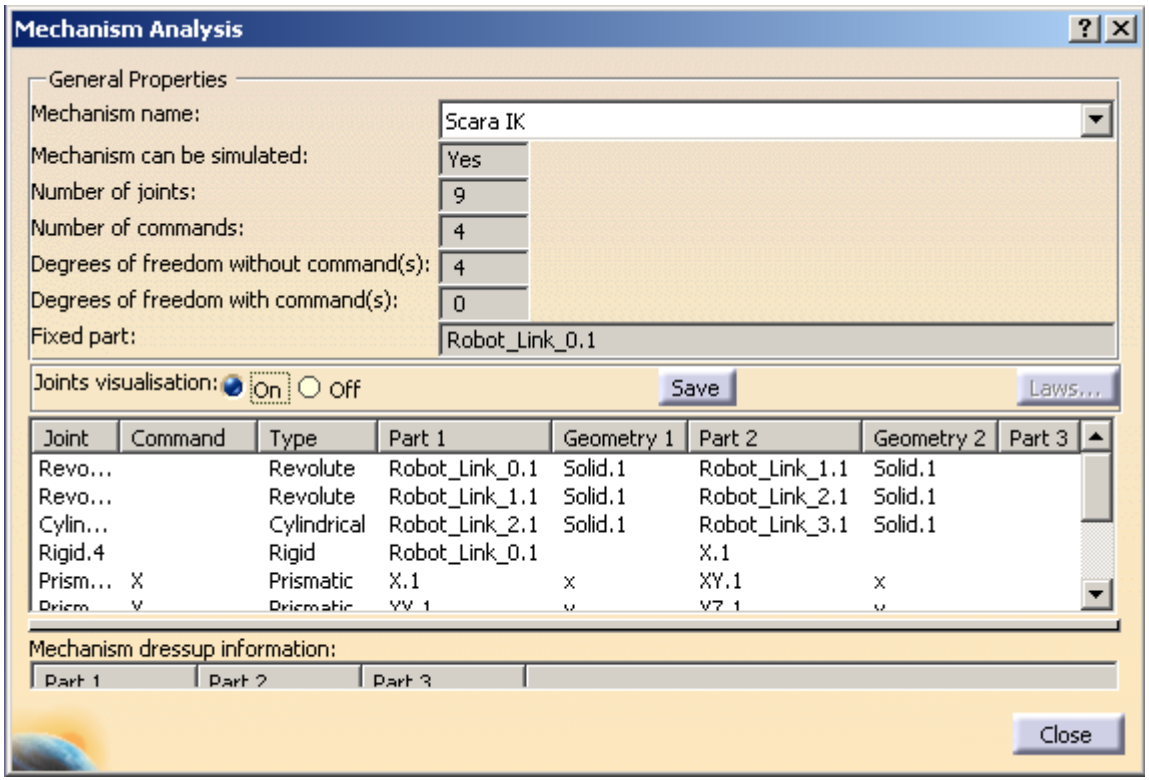
- Rename the commands



- Kinematics simulation
- Caution: the rotation axis is not well defined!

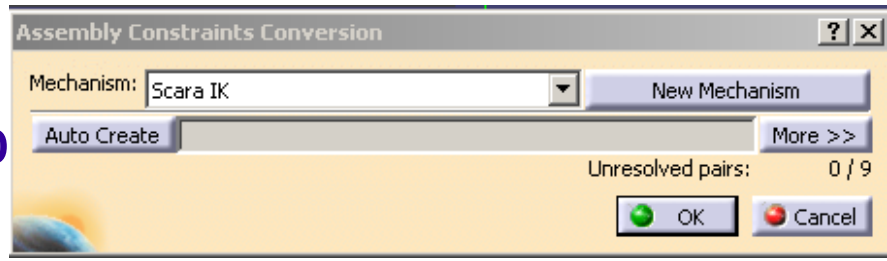
Mechanism analysis

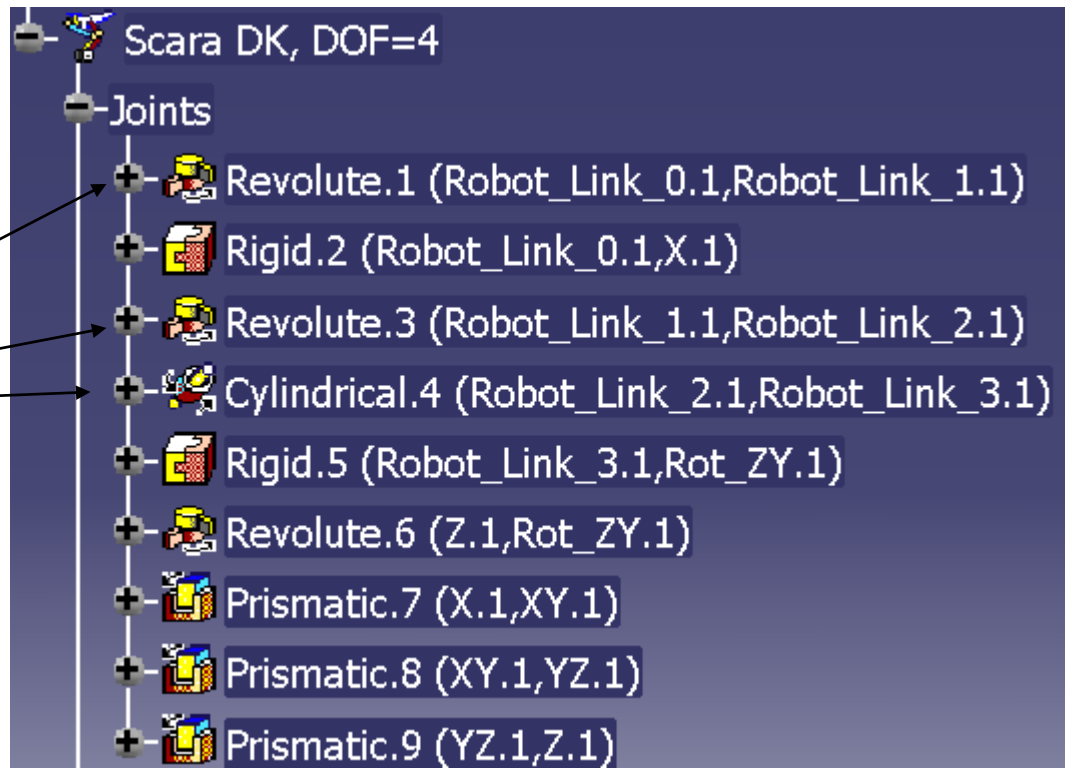
- 9 joints, 4 commands and 4 degrees of freedom



Update direct kinematics

- Delete the first mechanism
- Assembly constraints conversio
- Create a new mechanism





Add commands

- Rename commands
  - theta1, theta2, theta3
  - z

Link to an Excel spreadsheet

- Defining a spreadsheet that describes a square in the XY plane
- 5 columns, X, Y, Z, Theta, and the number of lines (Max)
- No unit ... because Catia real only real numbers

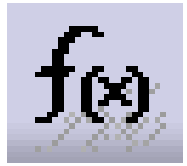
Microsoft Excel - trajectoire_carre.xls

Fichier Edition Affichage Insertion Format Outils Données Fenêtre ? Adobe PDF

F26 =

	A	B	C	D	E	F	G	H	I
1	X	Y	Z	Theta	Max				
2	0	0	0	0	301				
3	1	1	0	0	301				
4	2	2	0	0	301				
5	3	3	0	0	301				
6	4	4	0	0	301				
7	5	5	0	0	301				
8	6	6	0	0	301				
9	7	7	0	0	301				
10	8	8	0	0	301				
11	9	9	0	0	301				

Link to an Excel spreadsheet

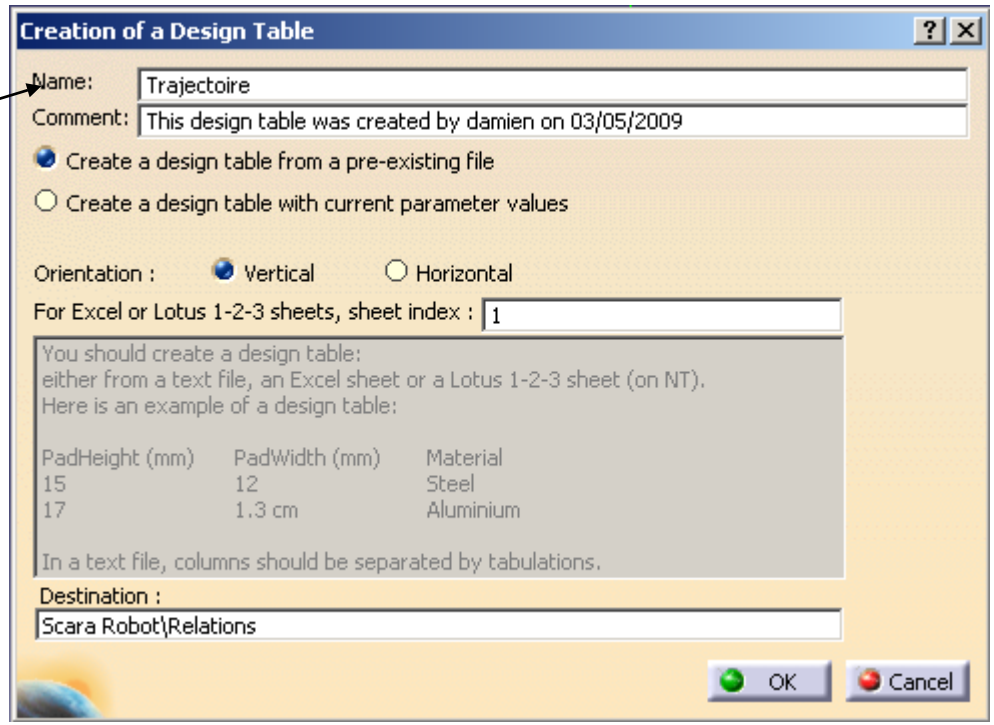


- Creating parameters
- Why?
  - Allow association with the Excel file (X, Y, Z, Theta)
  - See the variations of the position of the tool (XX, YY, ZZ, THETA)
  - Number of rows in the Excel file (Max)
- Caution
  - Create the parameters with the proper type (length and angle).

Link to an Excel spreadsheet

- Create a design table

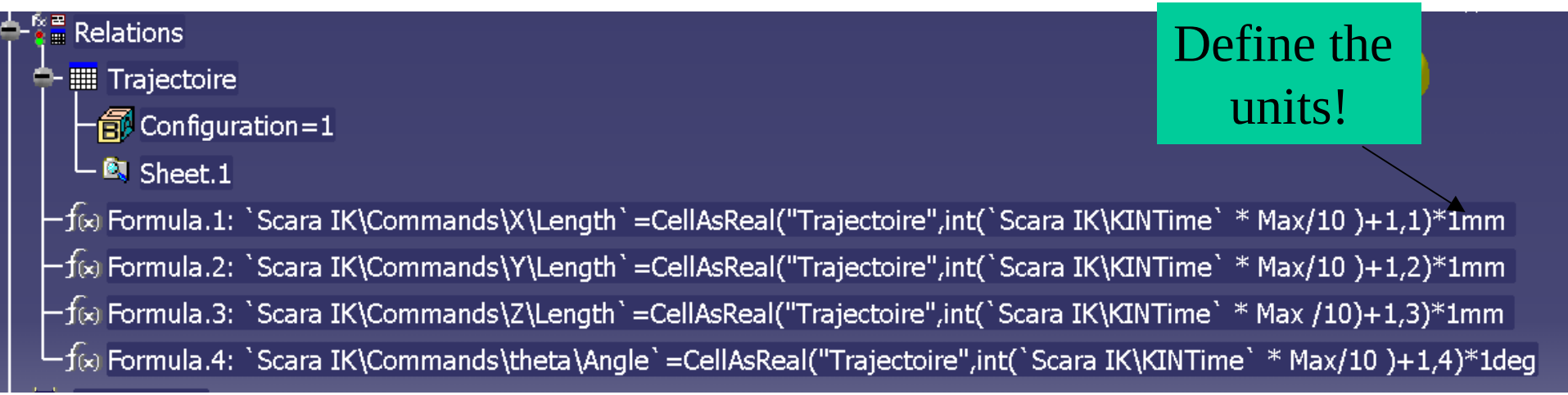
Name of the table



- Select the Excel file
- Combine the columns of the table with the parameters of the product automatically

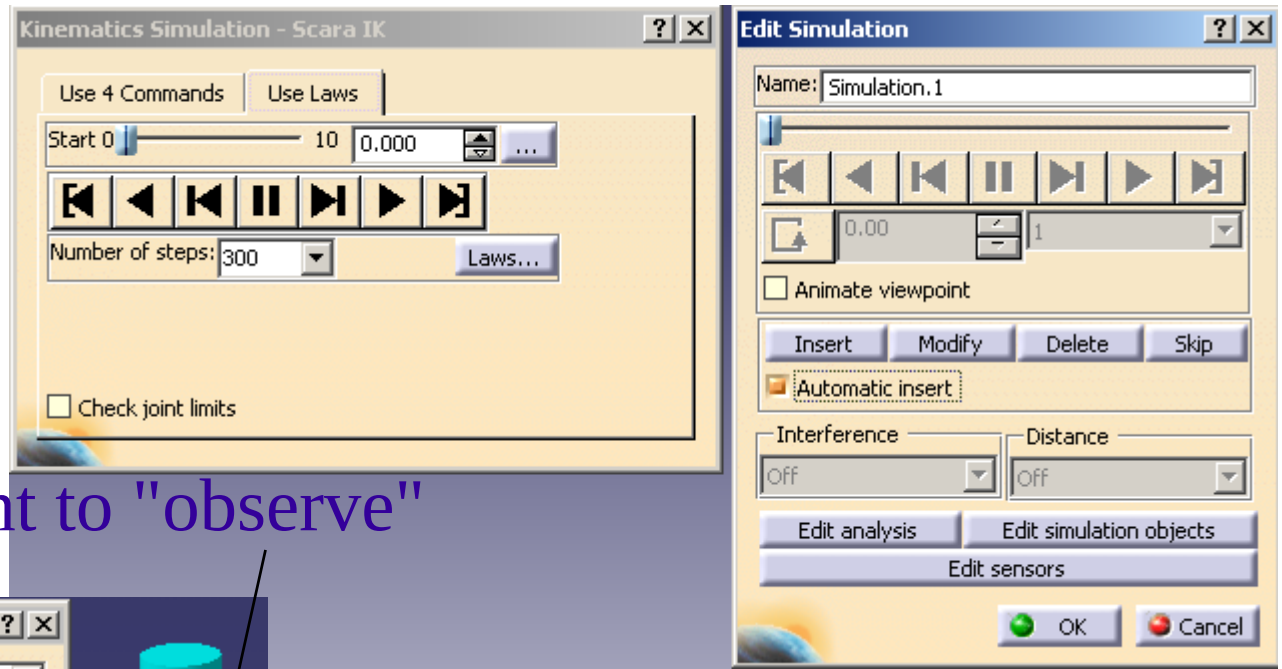
Link to an Excel spreadsheet

- Creation of a formula to read Excel spreadsheet
- Warning:
  - No function to known the number of lines
  - The timer is between 1 and 10 seconds by default
  - Create new laws for the « Scara IK"

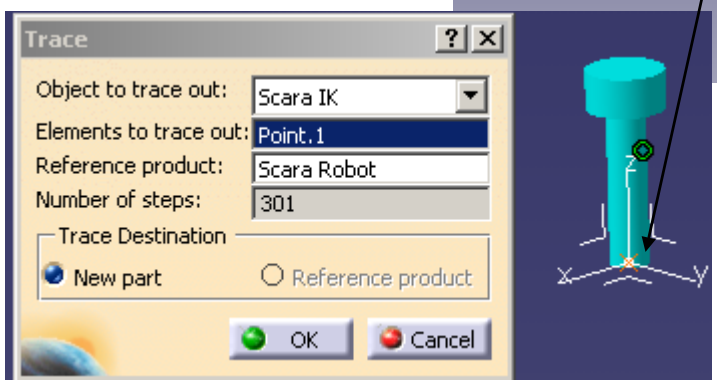


Trace the trajectory made by the end-effector

- Make a simulation with «Scara IK»



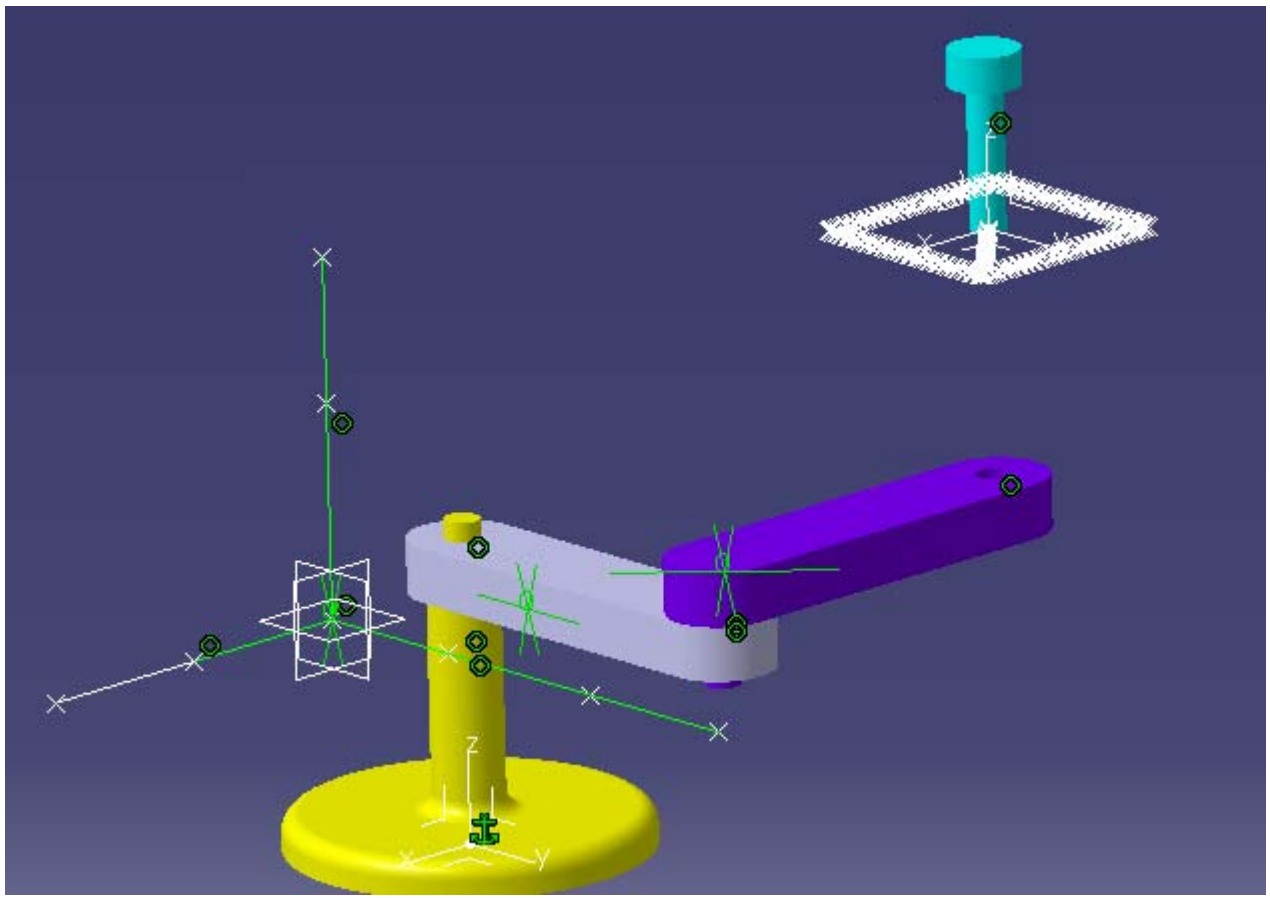
- Definition of point to "observe"



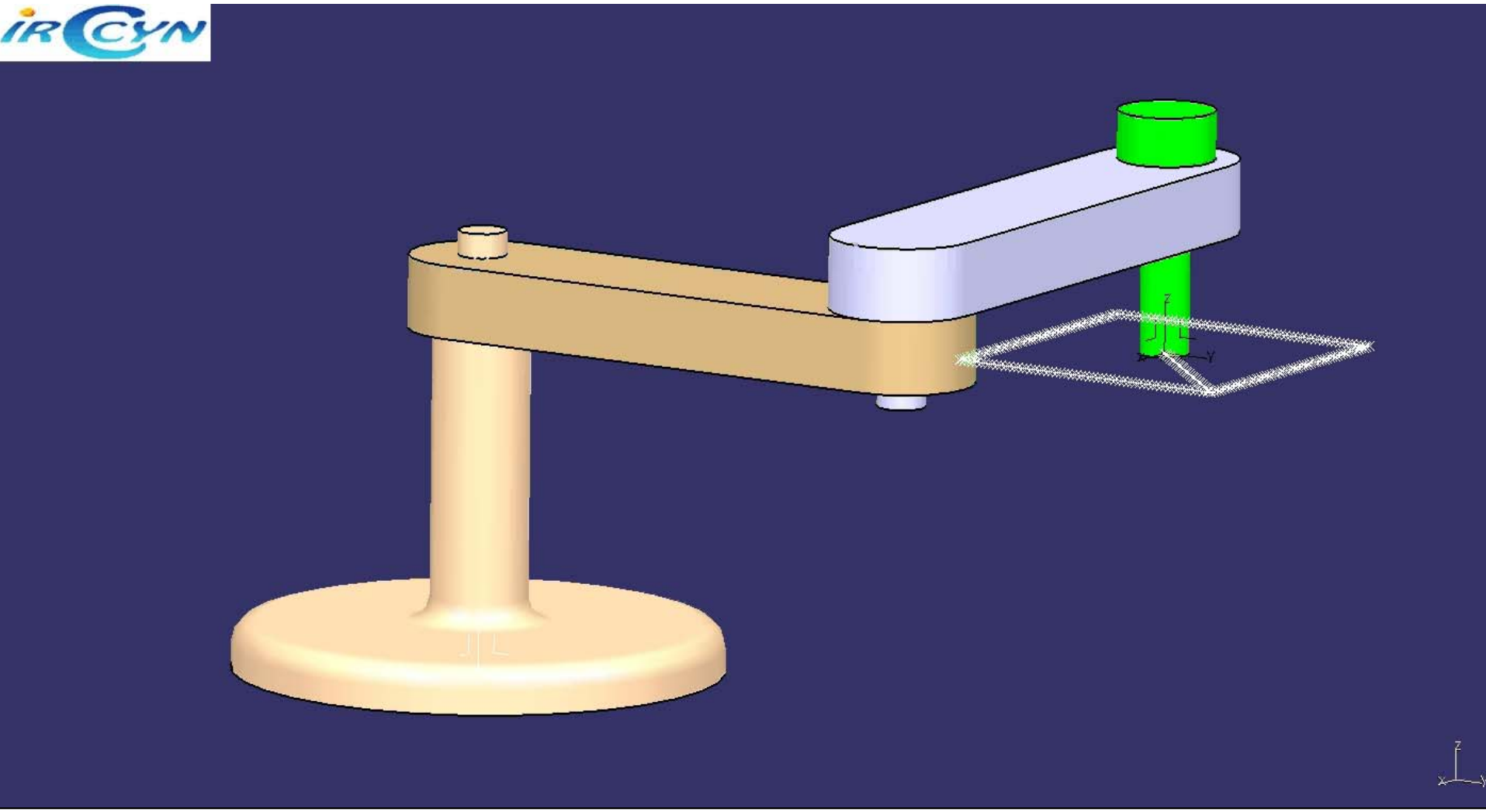
Save as « Trace_EMARO.CATPart »

Trace the trajectory made by the end-effector

- Insert the part «Trace_EMARO» in the product



Animation



Display the coordinates of the trajectory

- Problem:
  - No change in the configuration parameter table
  - How to display the position of the tool?
- Defining a rule  in the Knowledge module 
  - Same formula but parameters associated with XX, YY, ZZ, THETA