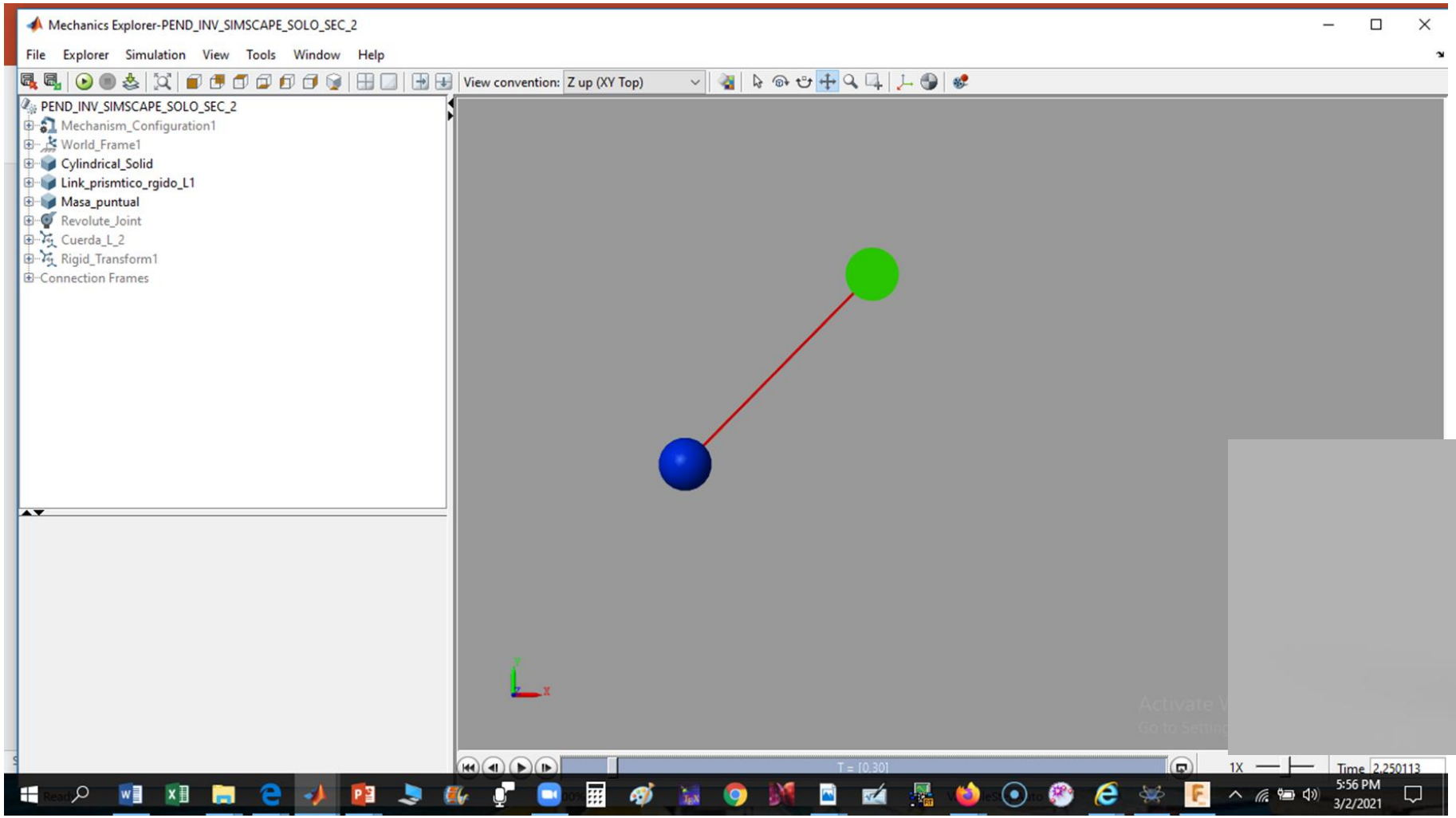
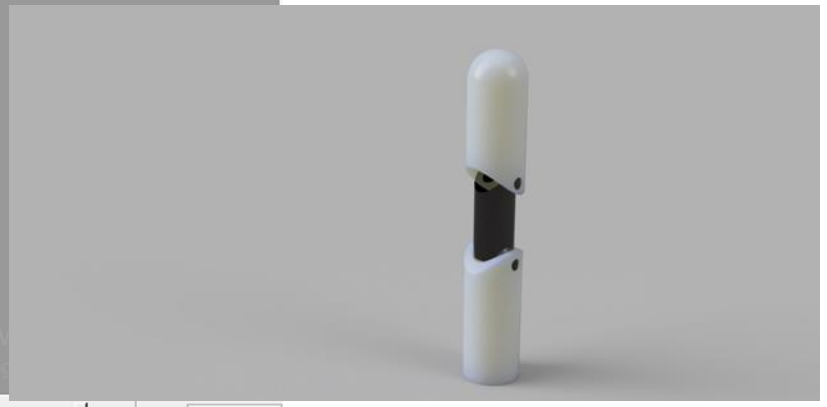
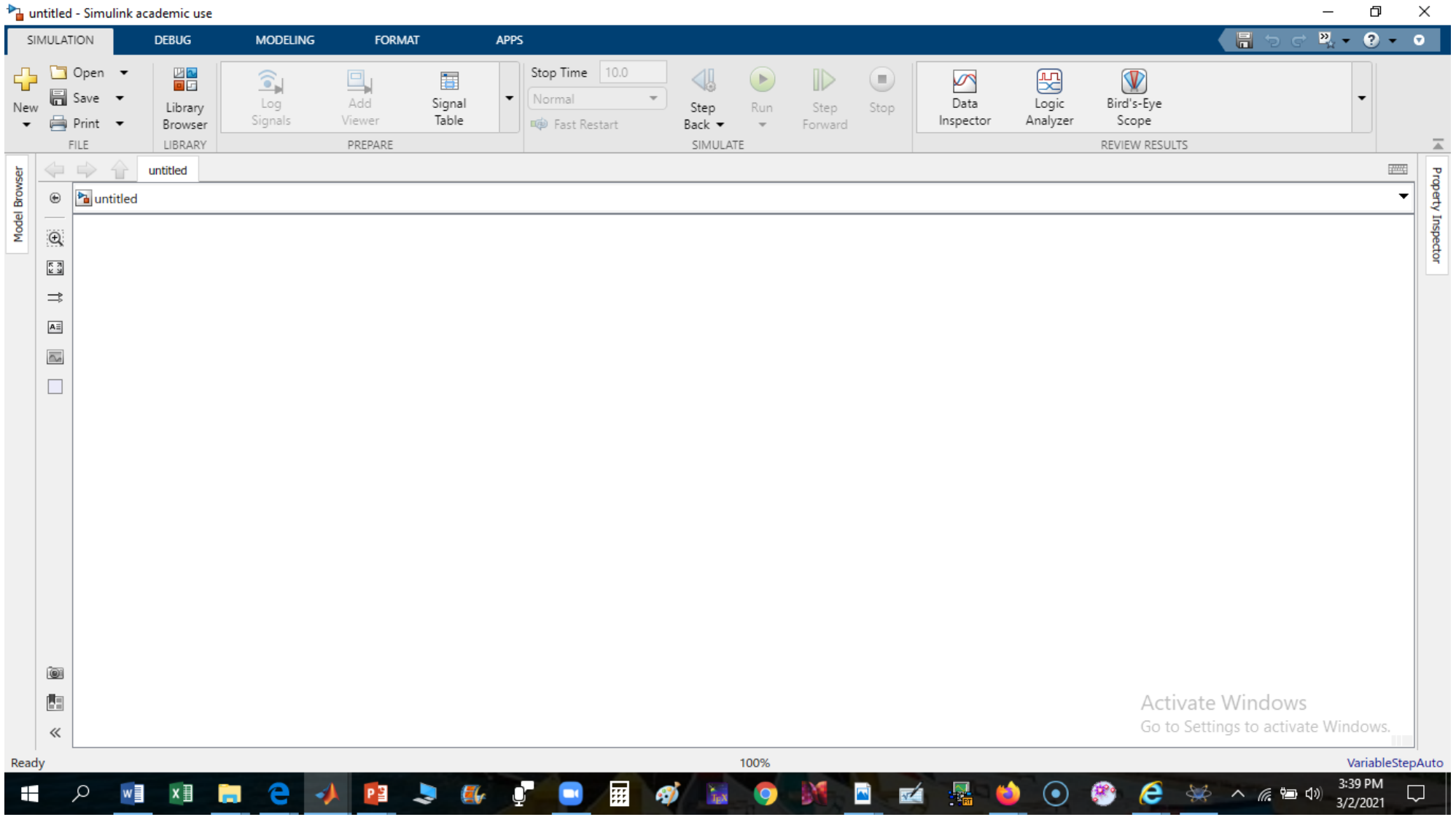
ACTIVIDAD CON SIMSCAPE MULTIBODY

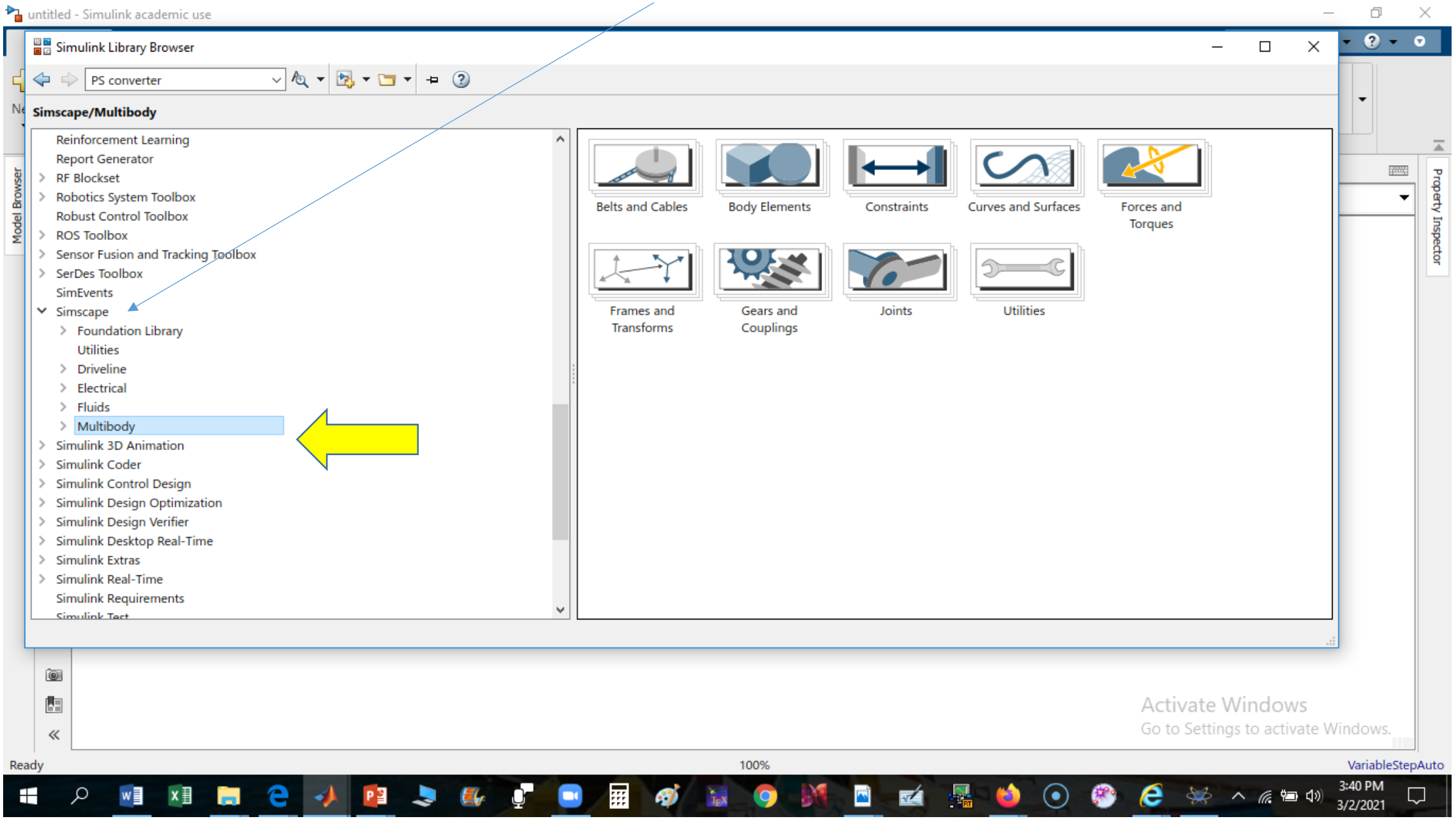
Construya un péndulo simple





Open SIMULINK -> Blank model




untitled - Simulink academic use
Simulink Library Browser
PS converter
Simscape/Multibody
Reinforcement Learning
Report Generator
RF Blockset
Robotics System Toolbox
Robust Control Toolbox
ROS Toolbox
Sensor Fusion and Tracking Toolbox
SerDes Toolbox
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Forces and Torques
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Gears and Couplings
Joints
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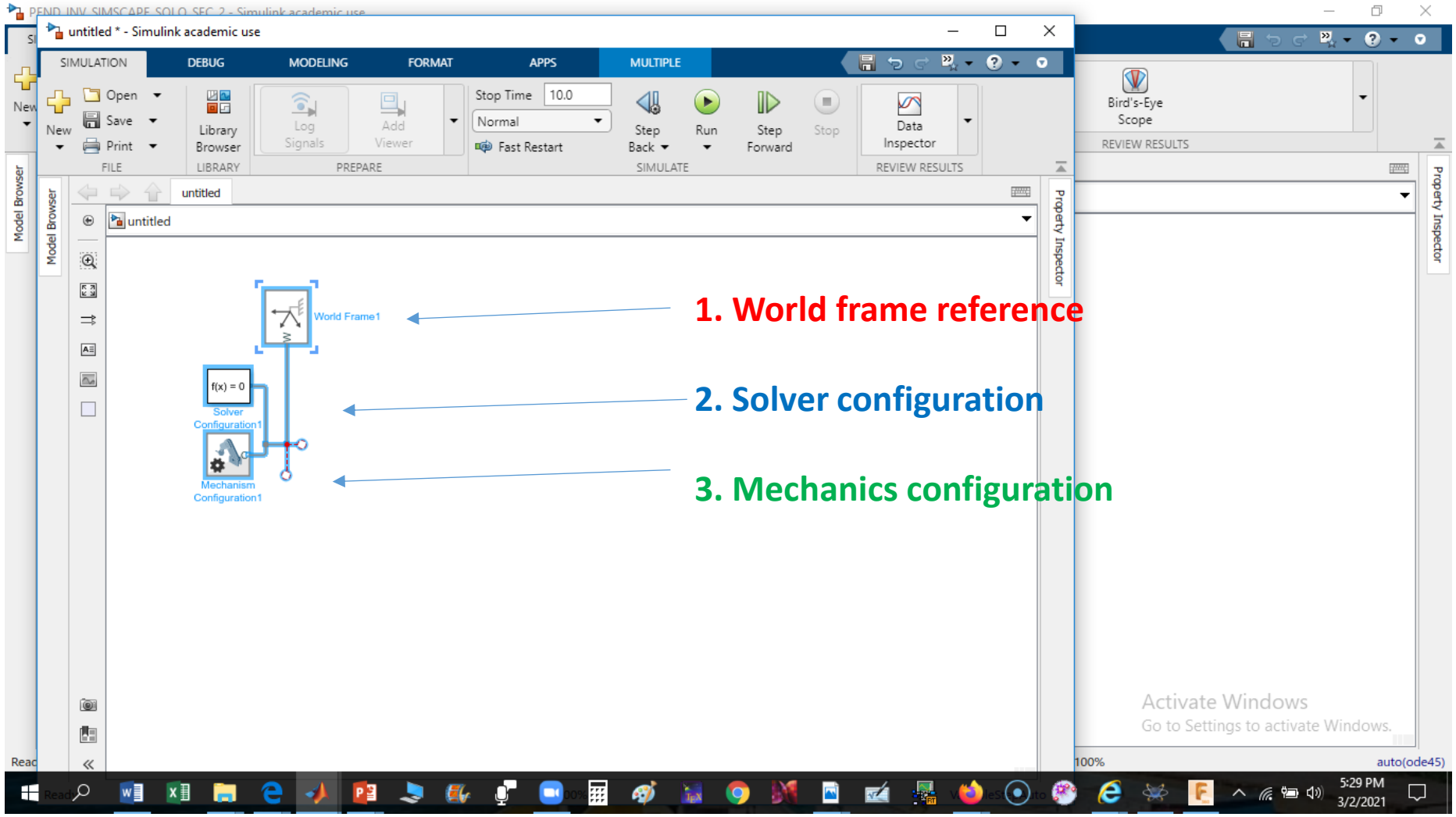
Model Browser
Property Inspector
Activate Windows
Go to Settings to activate Windows.
Ready
100%
VariableStepAuto
3:40 PM
3/2/2021

Primer paso: Add *initiliazing blocks*...



GUIDE TO START WITH SIMSCAPE MULTIBODY - PowerPoint (Product Activation Failed)

Simulink Library Browser

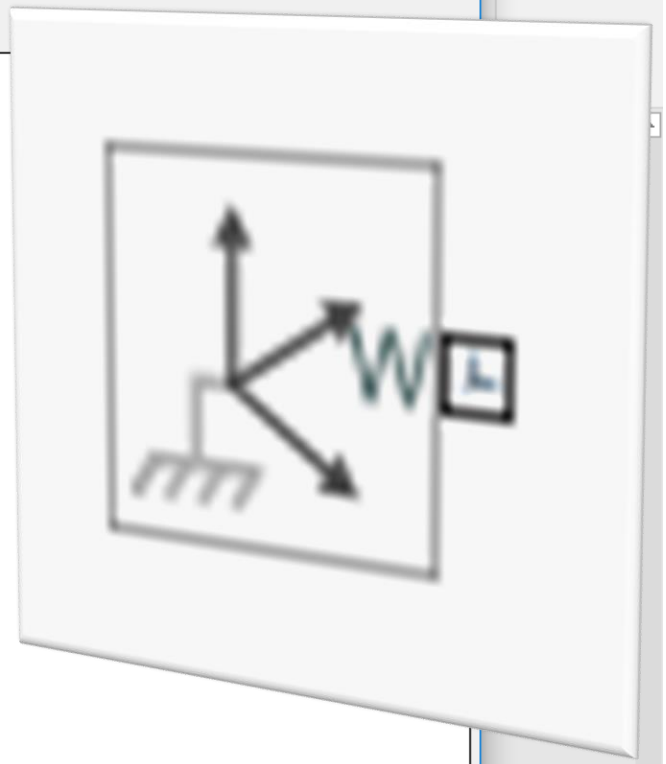
PS converter

Simscape/Multibody/Frames and Transforms

- Mechanical
  - Mechanical Sensors
  - Mechanical Sources
  - Mechanisms
  - Rotational Elements
  - Translational Elements
- Moist Air
- Physical Signals
- Thermal
- Thermal Liquid
- Two-Phase Fluid
- Utilities
- Driveline
- Electrical
- Fluids
- Multibody
  - Belts and Cables
  - Body Elements
  - Constraints
  - Curves and Surfaces
  - Forces and Torques
  - Frames and Transforms
  - Gears and Couplings
  - Joints
  - Utilities
- Simulink 3D Animation

Reference Frame | Rigid Transform | Transform Sensor | World Frame

WORLD FRAME REFERENCE

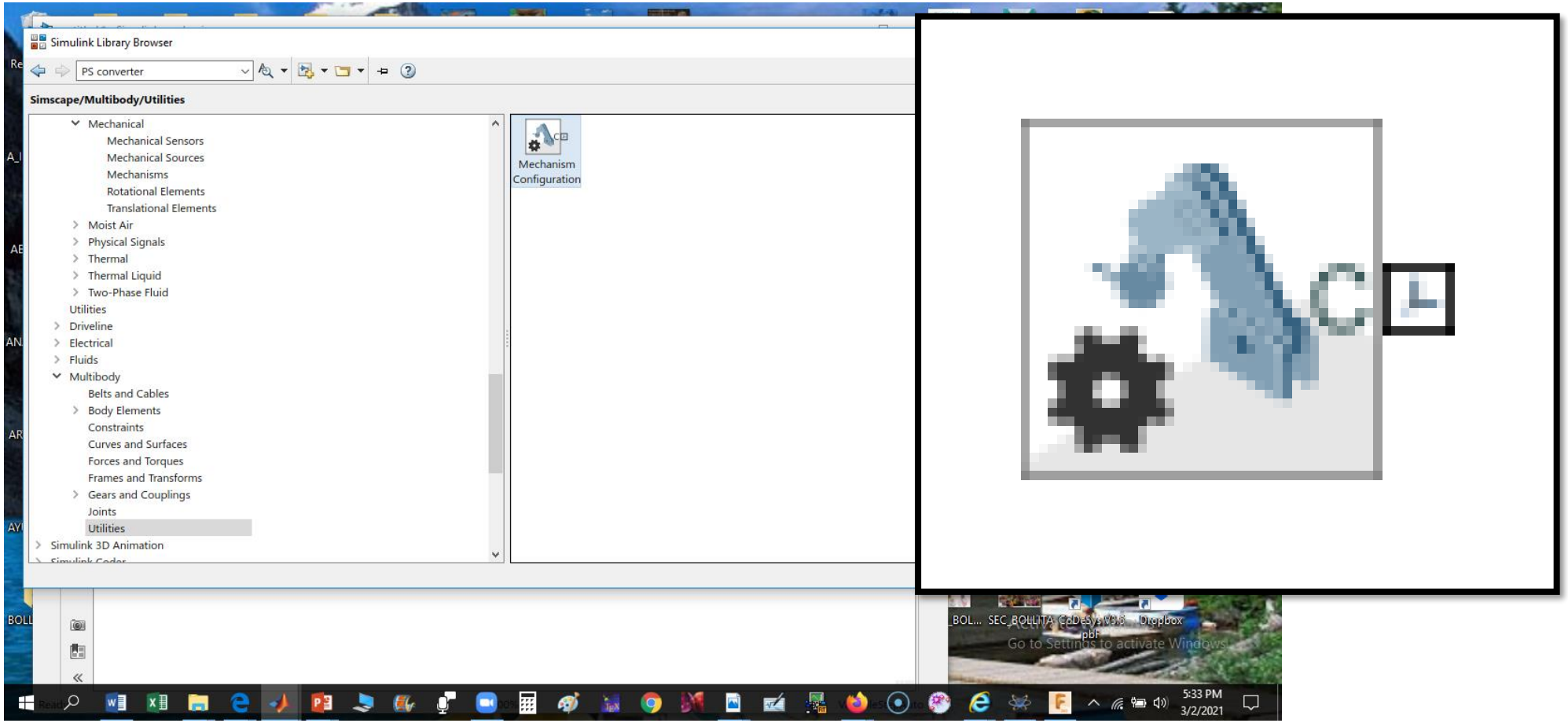


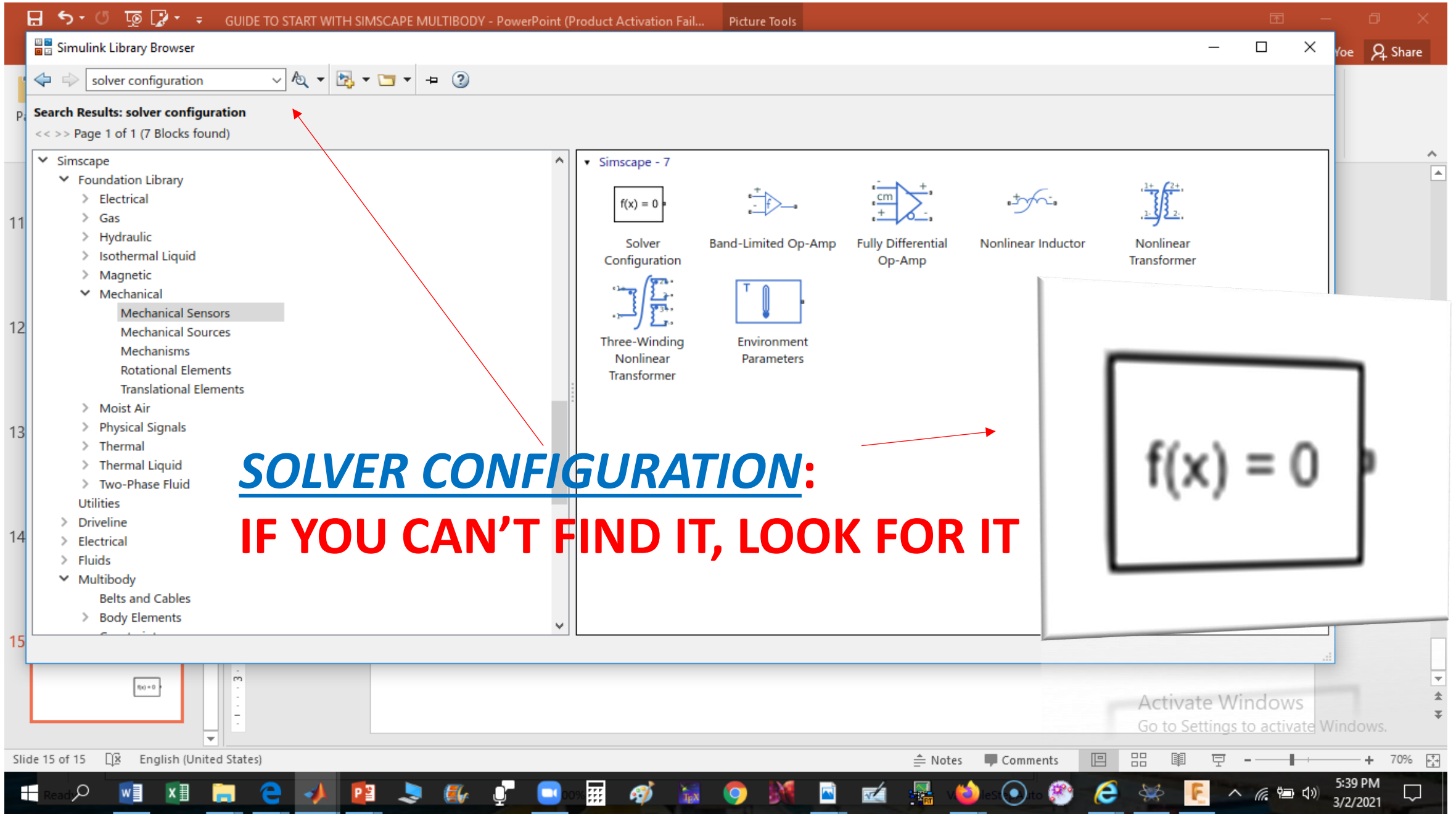
Activate Windows
Go to Settings to activate Windows.

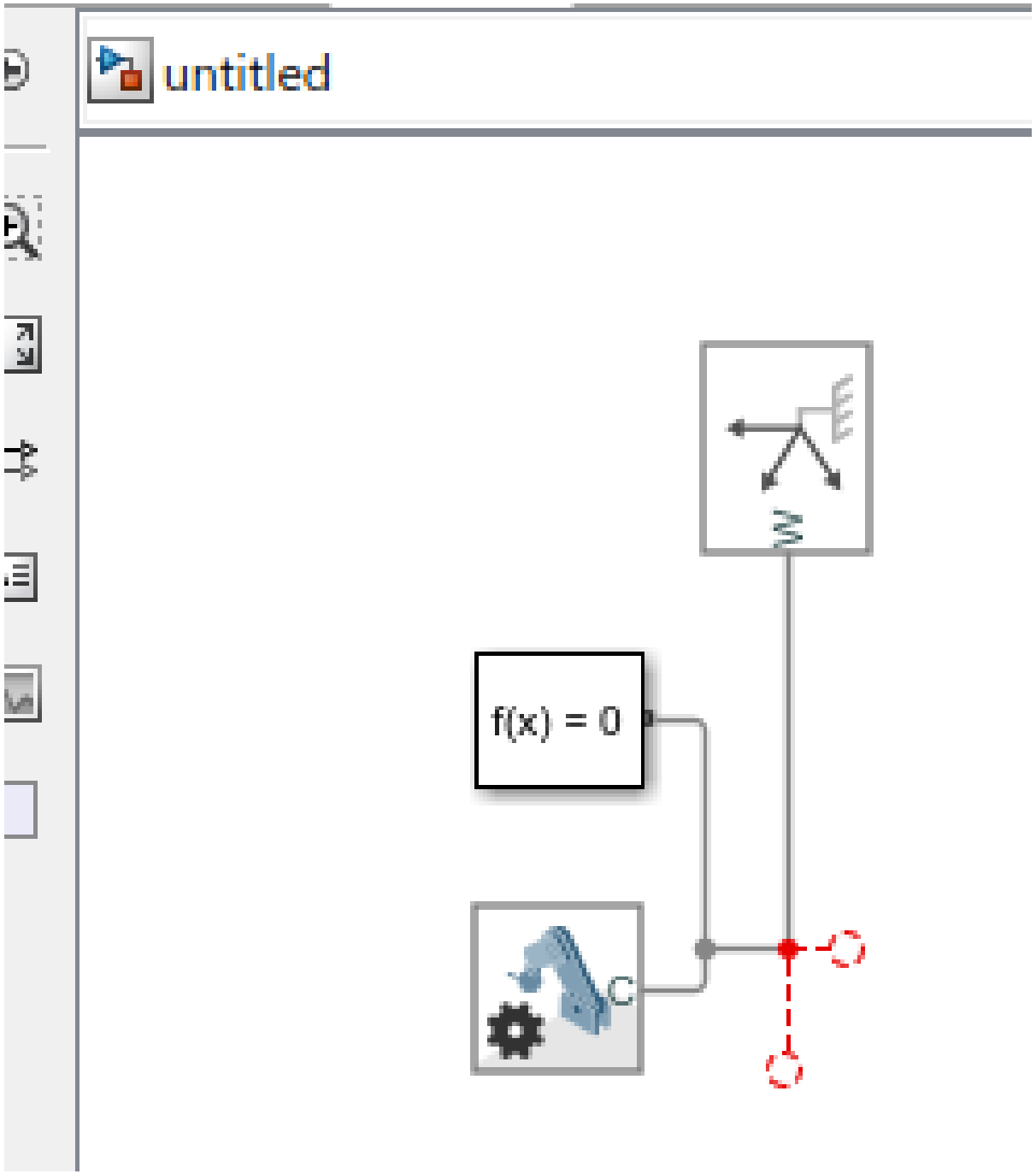
Slide 12 of 13 | English (United States) | Notes | Comments | 70%

5:32 PM
3/2/2021

Configuraciones mecánicas




GUIDE TO START WITH SIMSCAPE MULTIBODY - PowerPoint (Product Activation Fail...
Picture Tools
Simulink Library Browser
solver configuration
Search Results: solver configuration
<< >> Page 1 of 1 (7 Blocks found)
Simscape
Foundation Library
Electrical
Gas
Hydraulic
Isothermal Liquid
Magnetic
Mechanical
Mechanical Sensors
Mechanical Sources
Mechanisms
Rotational Elements
Translational Elements
Moist Air
Physical Signals
Thermal
Thermal Liquid
Two-Phase Fluid
Utilities
Driveline
Electrical
Fluids
Multibody
Belts and Cables
Body Elements
Simscape - 7
f(x) = 0
Solver Configuration
Band-Limited Op-Amp
Fully Differential Op-Amp
Nonlinear Inductor
Nonlinear Transformer
Three-Winding Nonlinear Transformer
Environment Parameters
SOLVER CONFIGURATION:
IF YOU CAN'T FIND IT, LOOK FOR IT
f(x) = 0
Activate Windows
Go to Settings to activate Windows.
Slide 15 of 15
English (United States)
Notes
Comments
70%
5:39 PM
3/2/2021



CONNECT THEM…

WARNING:

EVERY MECH. PIECE NEEDS

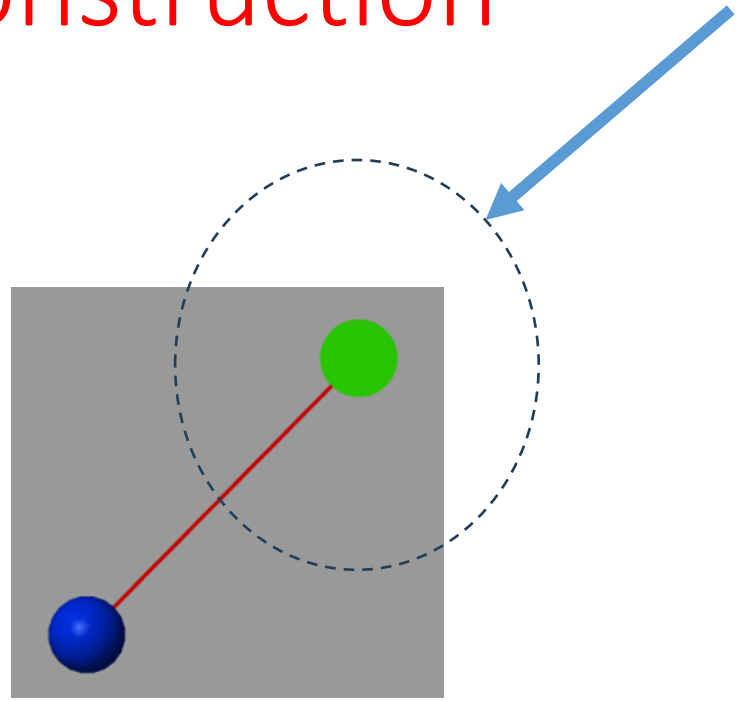
TRANSLATION/ROTATION

INFORMATION

SECOND STAGE: Top-down construction

ADD THE BASE:

It is a cylindrical body



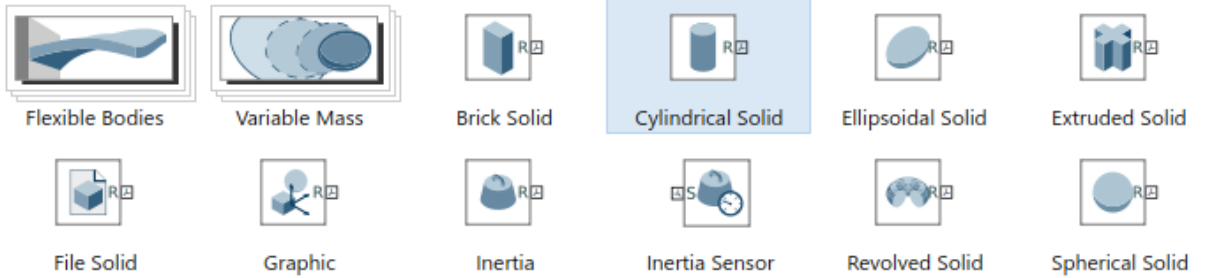
PEND_INV_SIMSCAPE_SOLO_SEC_2 - Simulink academic use

Simulink Library Browser

solver configuration

Simscape/Multibody/Body Elements

- Simscape
  - Foundation Library
    - Electrical
    - Gas
    - Hydraulic
    - Isothermal Liquid
    - Magnetic
    - Mechanical
      - Mechanical Sensors
      - Mechanical Sources
      - Mechanisms
      - Rotational Elements
      - Translational Elements
    - Moist Air
    - Physical Signals
    - Thermal
    - Thermal Liquid
    - Two-Phase Fluid
  - Utilities
  - Driveline
  - Electrical
  - Fluids
  - Multibody
    - Belts and Cables
    - Body Elements
    - Constraints
    - Curves and Surfaces
    - Forces and Torques
    - Frames and Transforms
    - Gears and Couplings
    - Joints



Model Browser

Property Inspector

Ready

View 1 warning

100%

auto(ode45)

6:05 PM
3/2/2021

File Edit View History Bookmarks Tools Help

Solid cylindrical element with g

https://www.mathworks.com/help/physmod/sm/ref/cylindricalsolid.html?s

Search

Play Chess vs comput... Team umizoomi: Enci... Juegos, episodios y vi... Yacki Yoggi | Baby Jak... | CBeebies Lat Am Fiesta en la Casa Embr... Altmetric it! DasErste.de Startseite -... Other Bookmarks

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Help Center

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« Multibody Modeling

« Bodies

Cylindrical Solid

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Description

Ports

Parameters

Extended Capabilities

See Also

Documentation Examples Functions Blocks Videos Answers Trial Software Product Updates

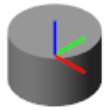
Cylindrical Solid

Solid cylindrical element with geometry, inertia, and color

Library: Simscape / Multibody / Body Elements

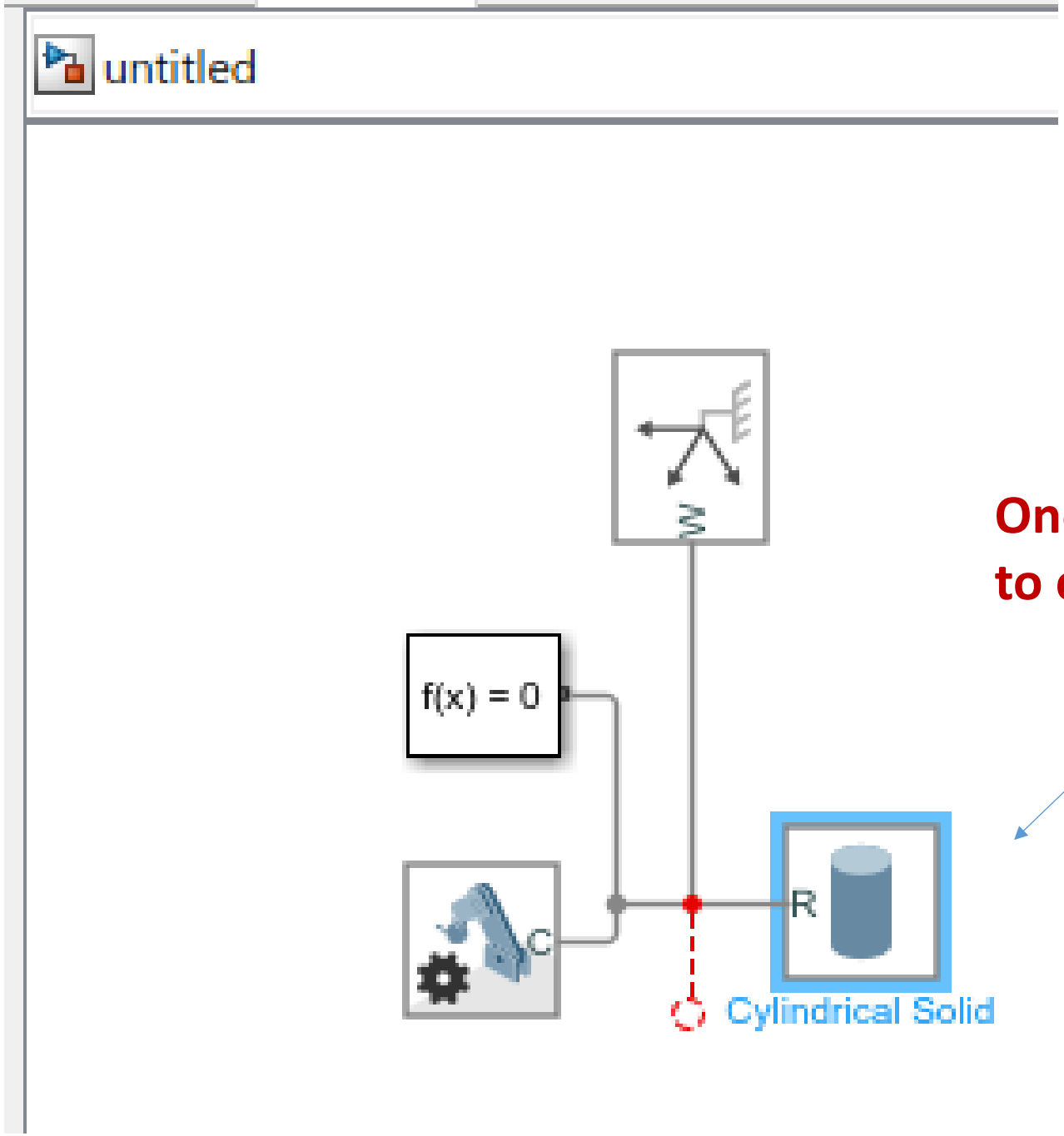
Description

The Cylindrical Solid block is a cylindrical shape with geometry center coincident with the refe



The Cylindrical Solid block adds to the attached frame a solid element with geometry, inertia, and color. The solid element can be a simple rigid body or part of a compound rigid

6:06 PM 3/2/2021



Once connected, double click on it to configure…

Solid : Cylindrical Solid

Description

Represents a solid combining a geometry, an inertia and mass, a graphics component, and rigidly attached frames into a single unit. A solid is the common building block of rigid bodies. The Solid block obtains the inertia from the geometry and density, from the geometry and mass, or from an inertia tensor that you specify.

In the expandable nodes under Properties, select the types of geometry, inertia, graphic features, and frames that you want and their parameterizations.

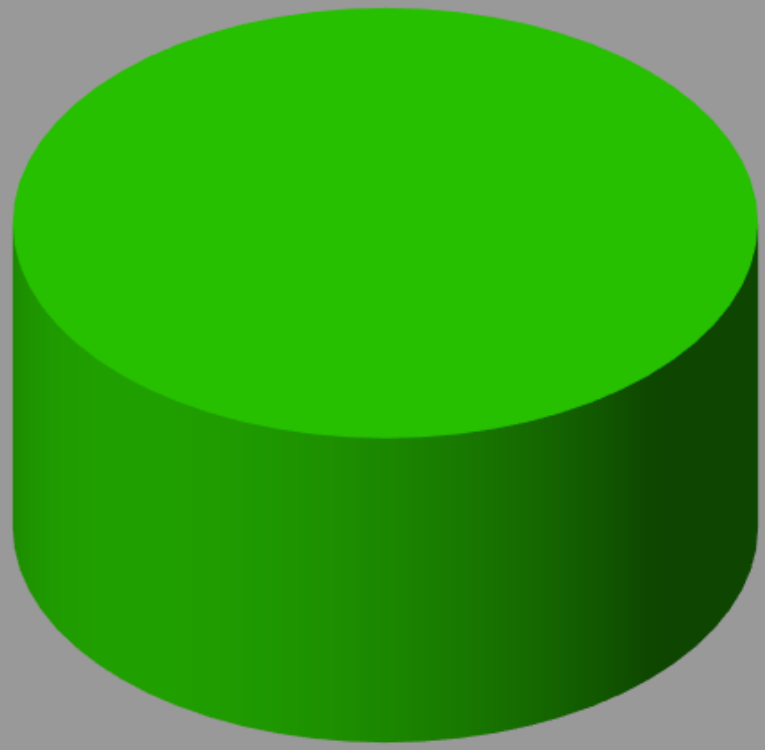
Port R is a frame port that represents a reference frame associated with the geometry. Each additional created frame generates another frame port.

Properties

Geometry		
Radius	0.1	m
Length	0.1	m
Export		
Inertia		
Type	Calculate from Geometry	
Based on	Density	
Density	5000	kg/m^3
Derived Values	Update	
Graphic		
Frames		

OK Cancel Help Apply

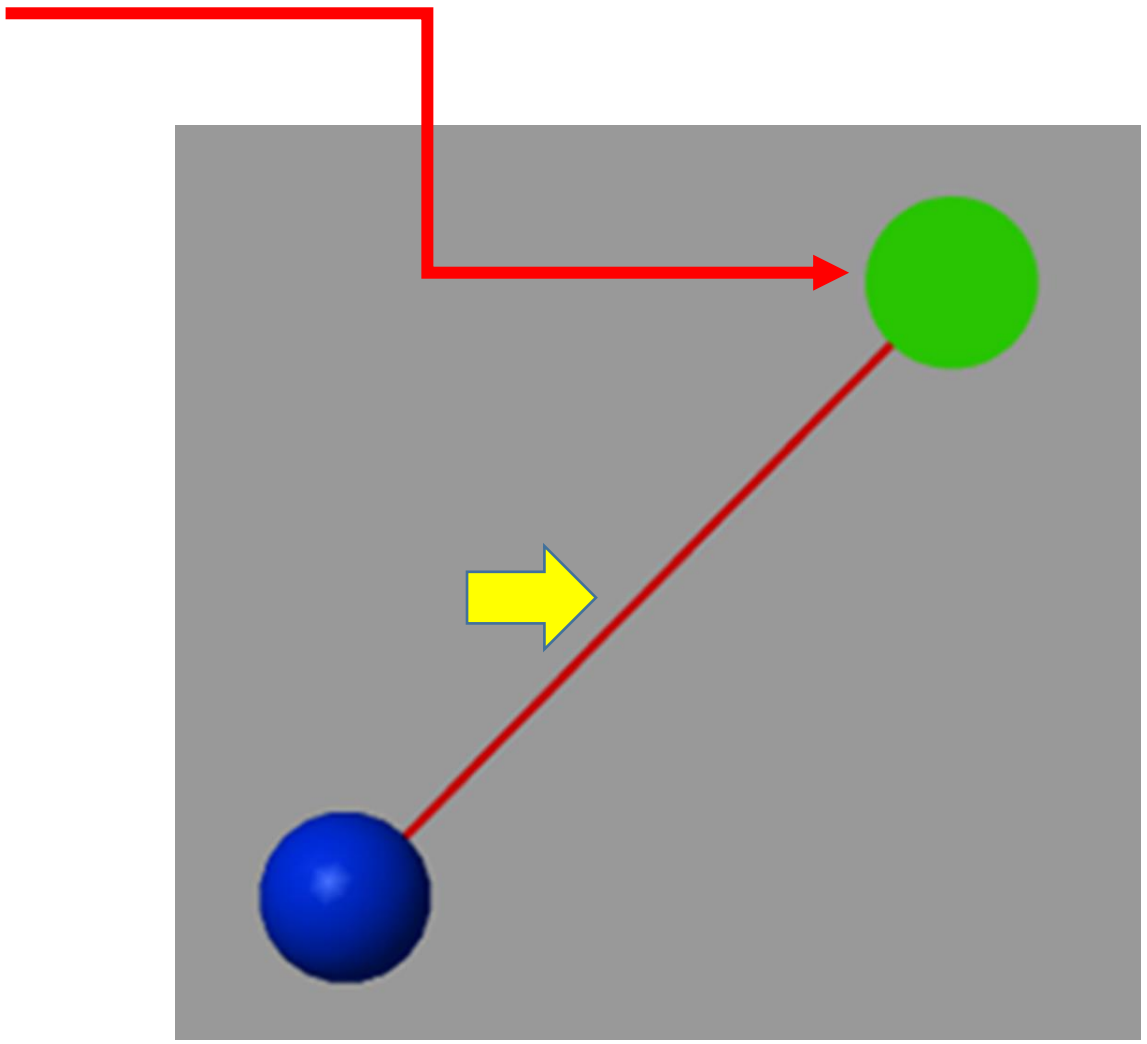
DEFINE SIZE...

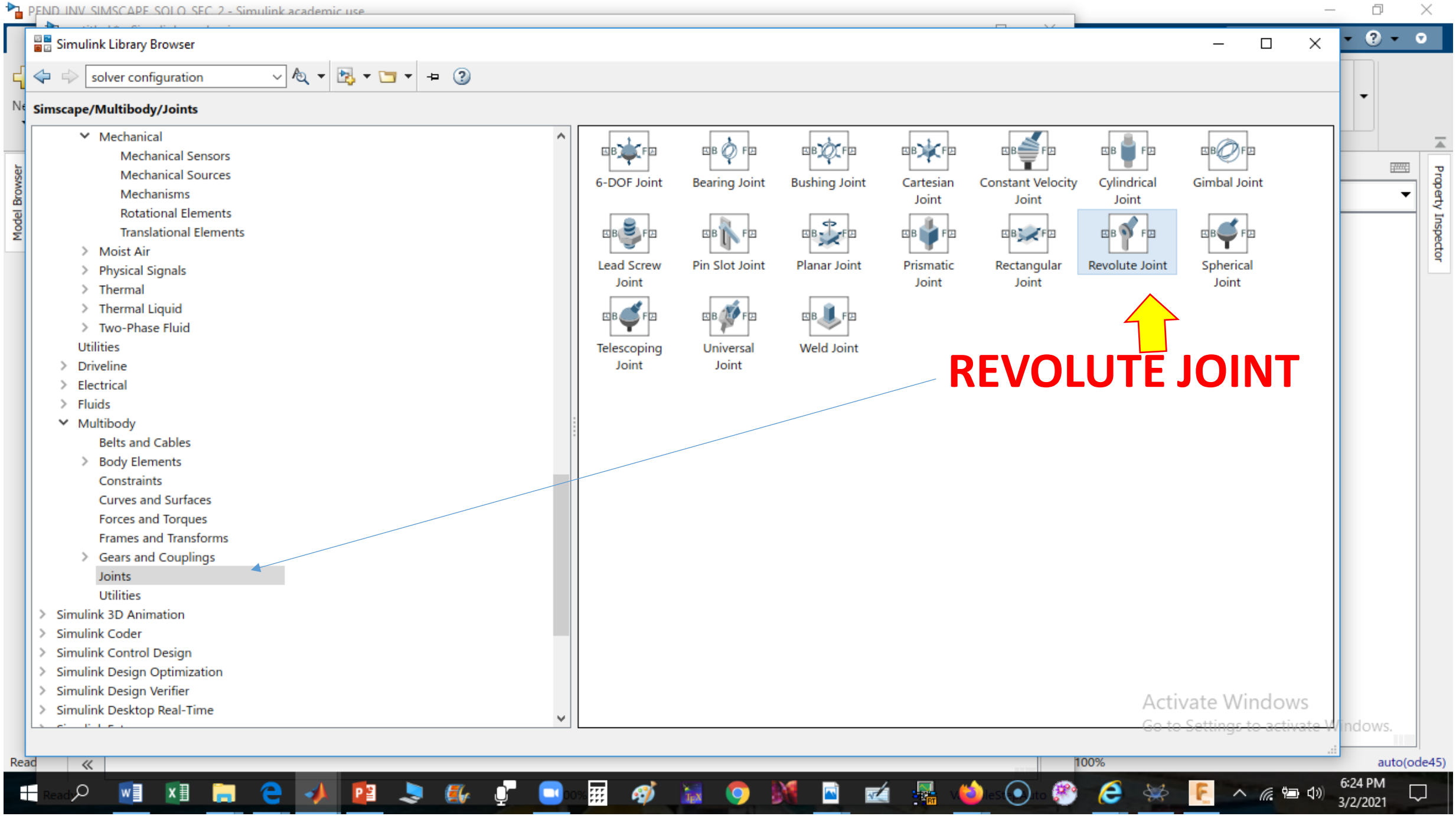


DEFINE DENSITY, MASS,...

6:10 PM
3/2/2021

We need a joint for the base/pivot…




Simulink Library Browser
solver configuration
Simscape/Multibody/Joints
Mechanical
Mechanical Sensors
Mechanical Sources
Mechanisms
Rotational Elements
Translational Elements
Moist Air
Physical Signals
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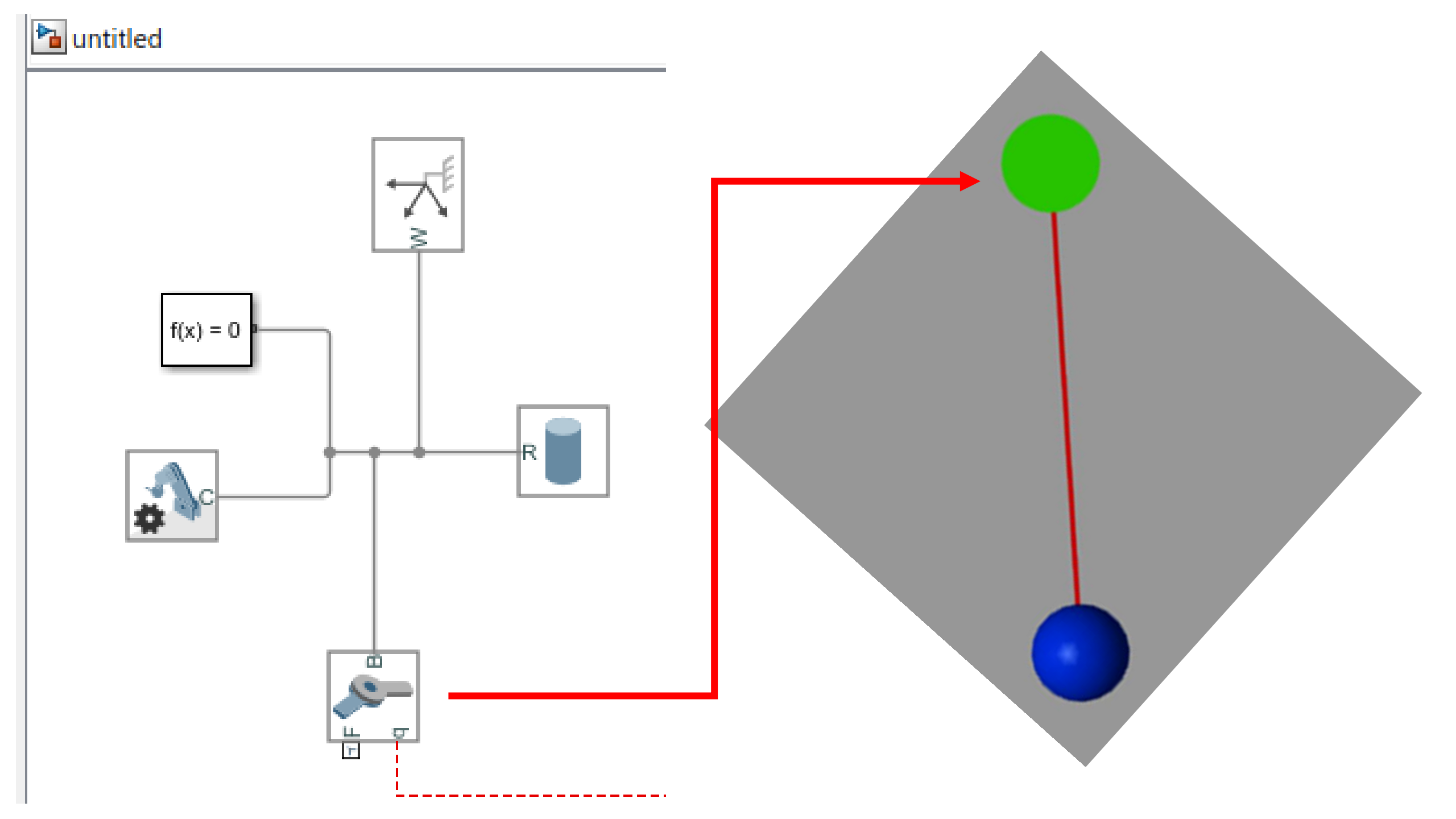
6-DOF Joint
Bearing Joint
Bushing Joint
Cartesian Joint
Constant Velocity Joint
Cylindrical Joint
Gimbal Joint
Lead Screw Joint
Pin Slot Joint
Planar Joint
Prismatic Joint
Rectangular Joint
Revolute Joint
Spherical Joint
Telescoping Joint
Universal Joint
Weld Joint
REVOLUTE JOINT
Activate Windows
Go to Settings to activate Windows.
Model Browser
Property Inspector
auto(ode45)
6:24 PM
3/2/2021


untitled
W
f(x) = 0
C
R
B
F
q

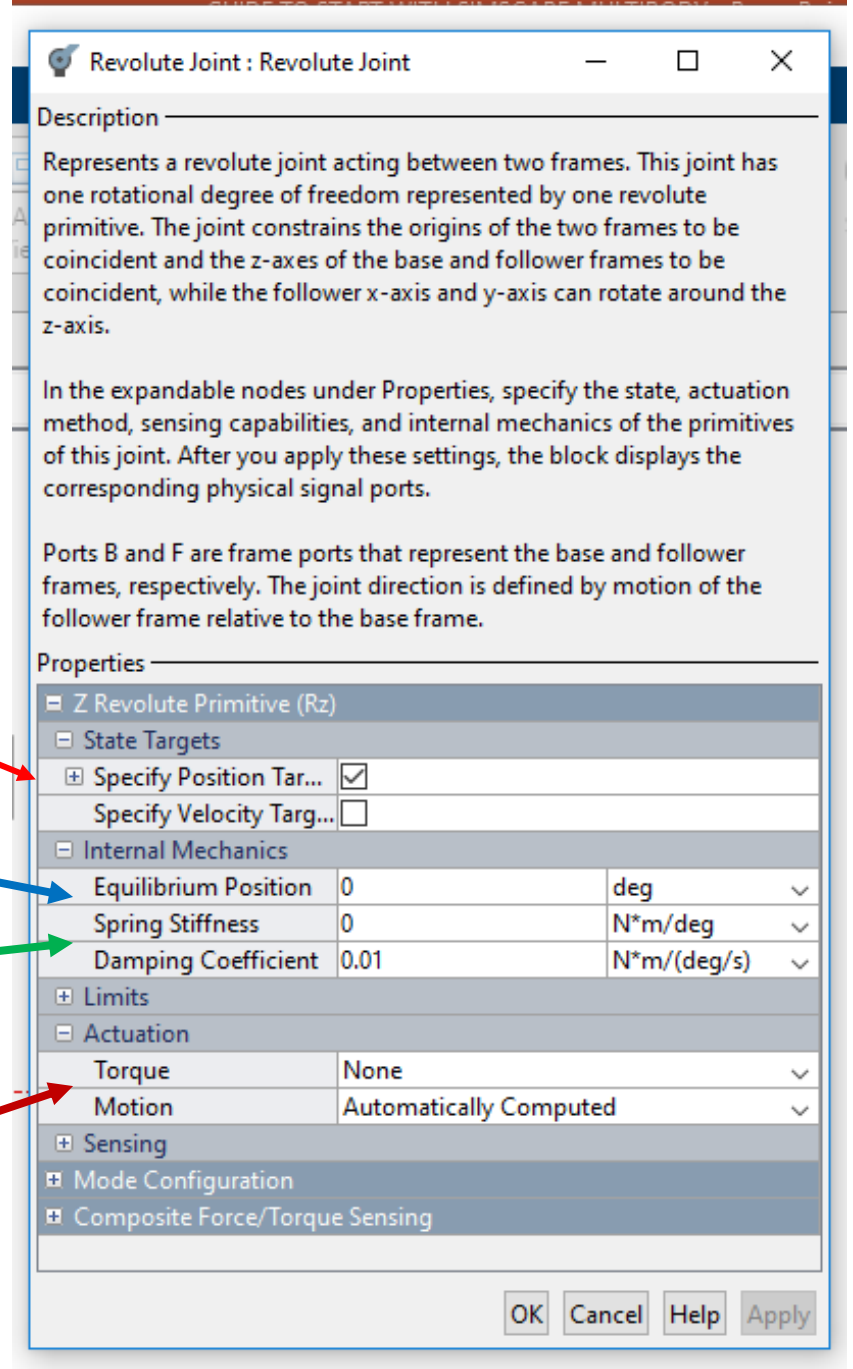
Configure the *joint*…

Select Position Target

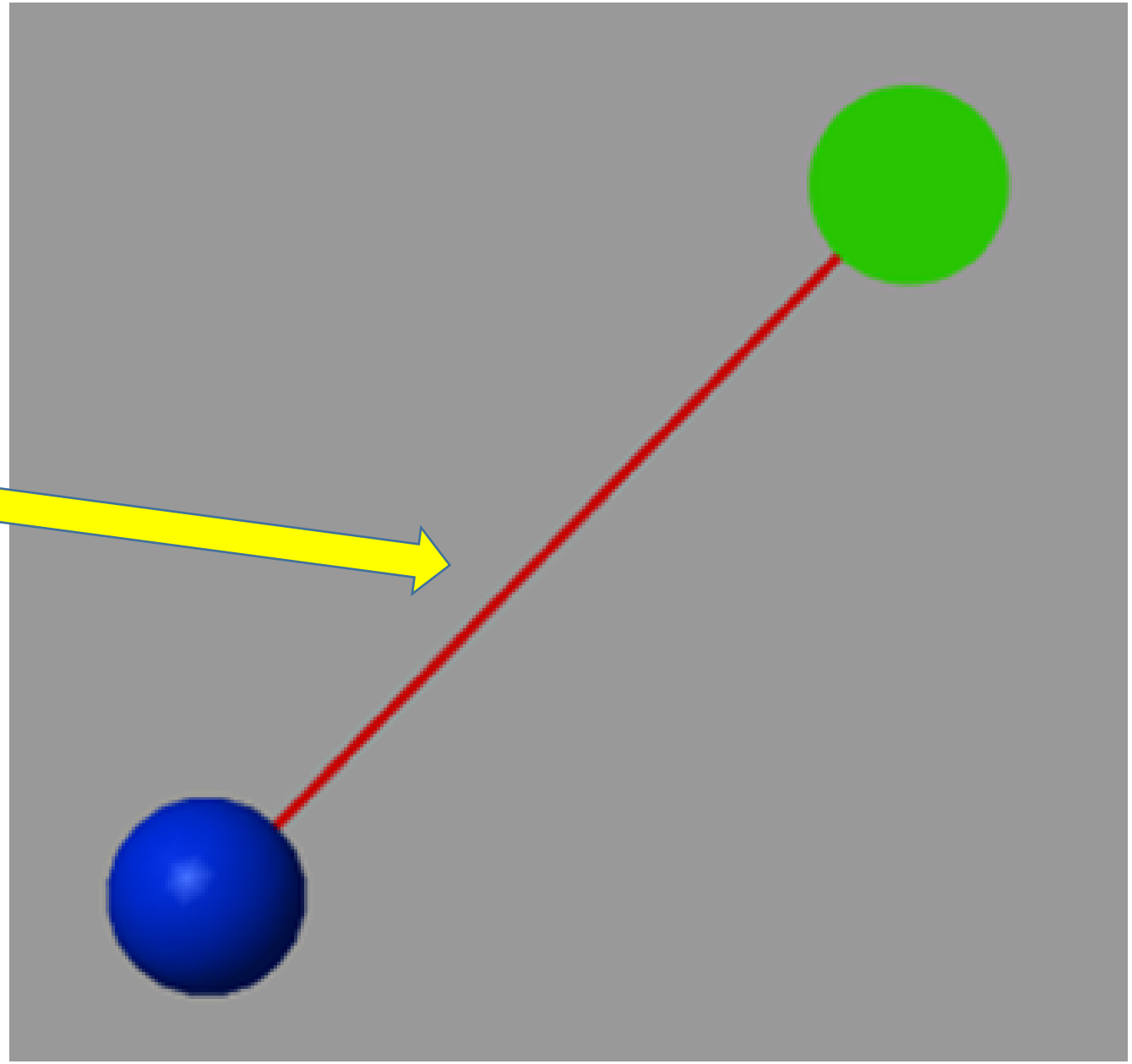
Choose equilibrium point…

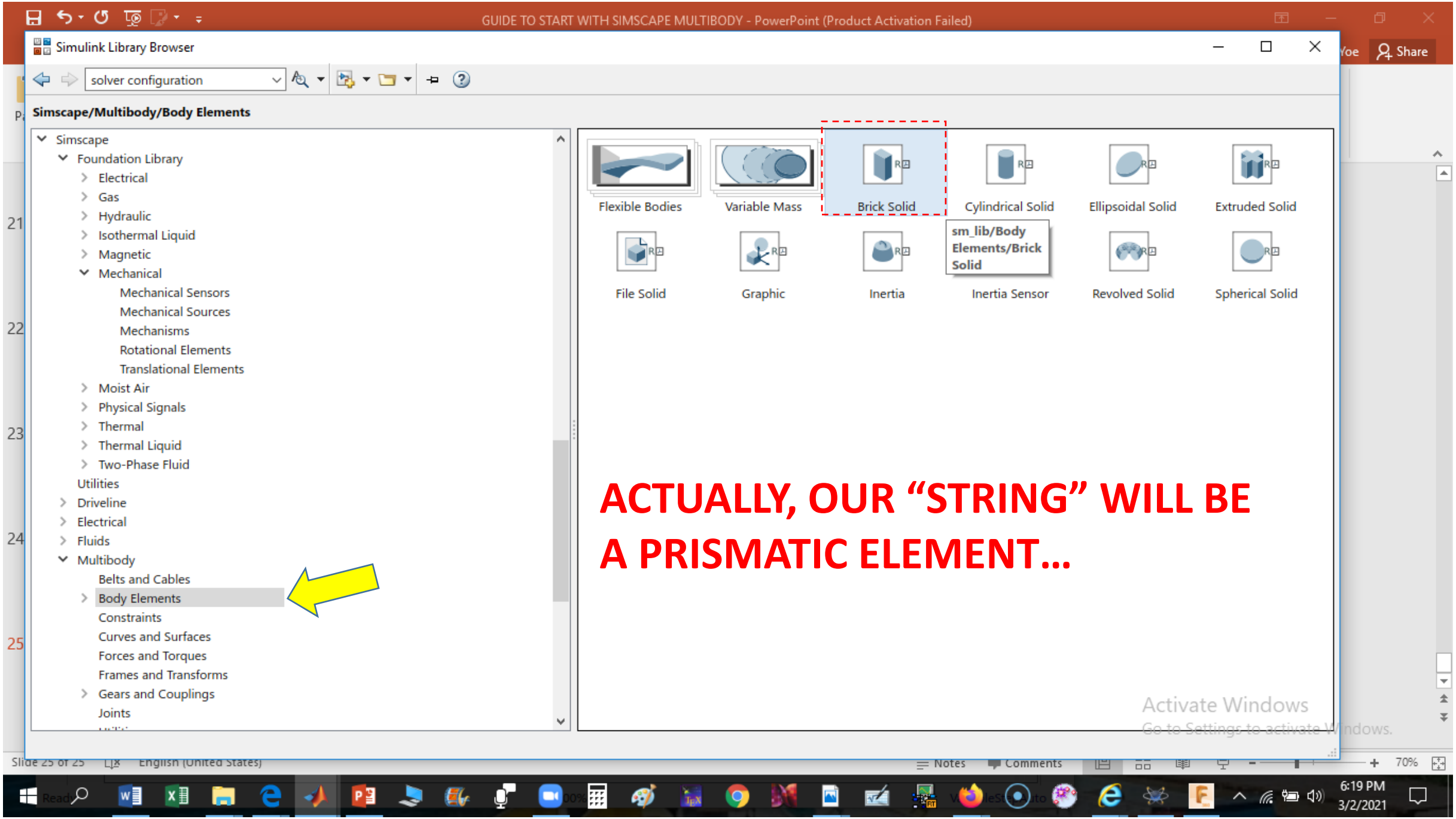
Define “b” and “k”….

If you do not provide any input, do this…



NOW, WE NEED THE STICK/STRING…




GUIDE TO START WITH SIMSCAPE MULTIBODY - PowerPoint (Product Activation Failed)
Simulink Library Browser
solver configuration
Simscape/Multibody/Body Elements
Simscape
Foundation Library
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Flexible Bodies
Variable Mass
Brick Solid
Cylindrical Solid
Ellipsoidal Solid
Extruded Solid
File Solid
Graphic
Inertia
Inertia Sensor
Revolved Solid
Spherical Solid
sm_lib/Body Elements/Brick Solid
ACTUALLY, OUR "STRING" WILL BE A PRISMATIC ELEMENT…
Activate Windows
Go to Settings to activate Windows.
Slide 25 of 25
English (United States)
Notes
Comments
70%
6:19 PM
3/2/2021

Solid : Prismatic Link

Description

Represents a solid combining a geometry, an inertia and mass, a graphics component, and rigidly attached frames into a single unit. A solid is the common building block of rigid bodies. The Solid block obtains the inertia from the geometry and density, from the geometry and mass, or from an inertia tensor that you specify.

In the expandable nodes under Properties, select the types of geometry, inertia, graphic features, and frames that you want and their parameterizations.

Port R is a frame port that represents a reference frame associated with the geometry. Each additional created frame generates another frame port.

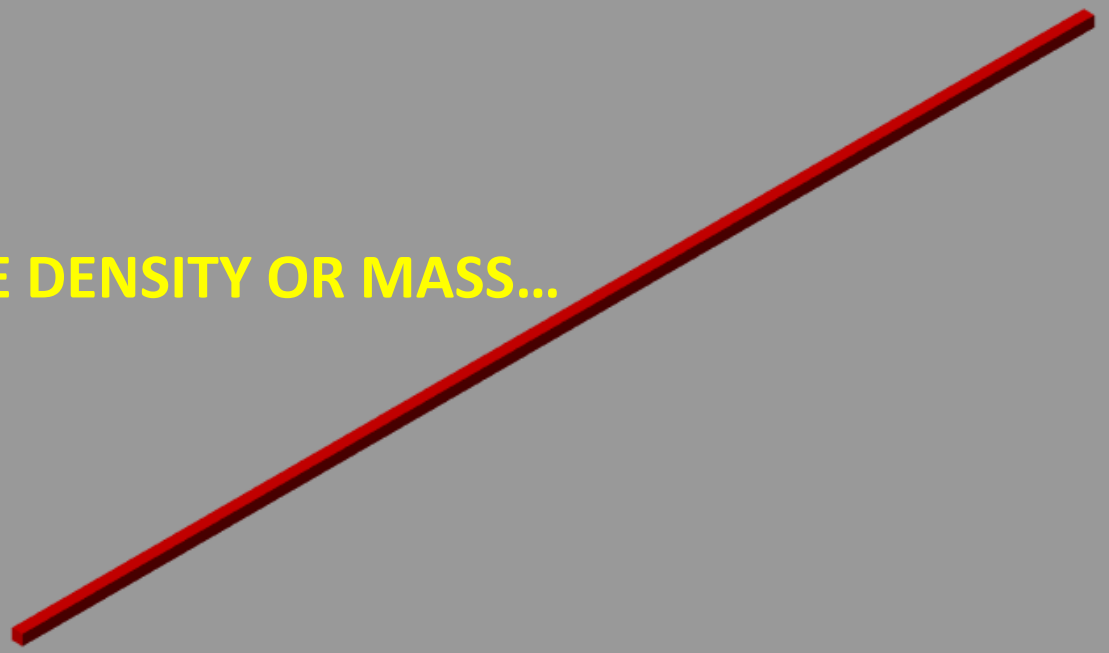
Properties

Geometry		
Dimensions	[0.01 1 0.01]	m
Export		
Inertia		
Type	Calculate from Geometry	
Based on	Density	
Density	0	kg/m^3
Derived Values	Update	
Graphic		
Frames		

OK Cancel Help Apply

DEFINE SIZE (X-Y-Z) ...

DEFINE DENSITY OR MASS...

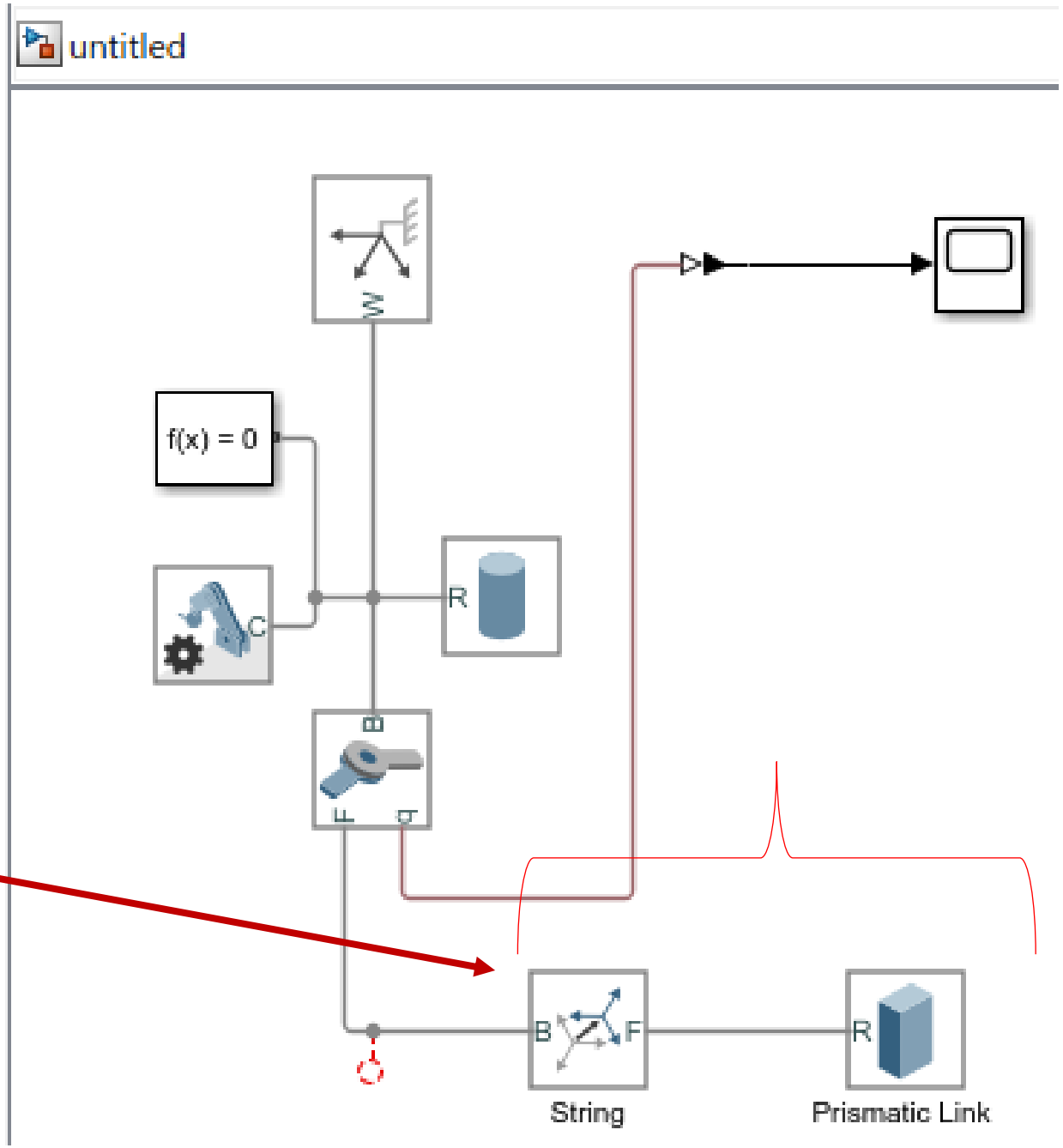


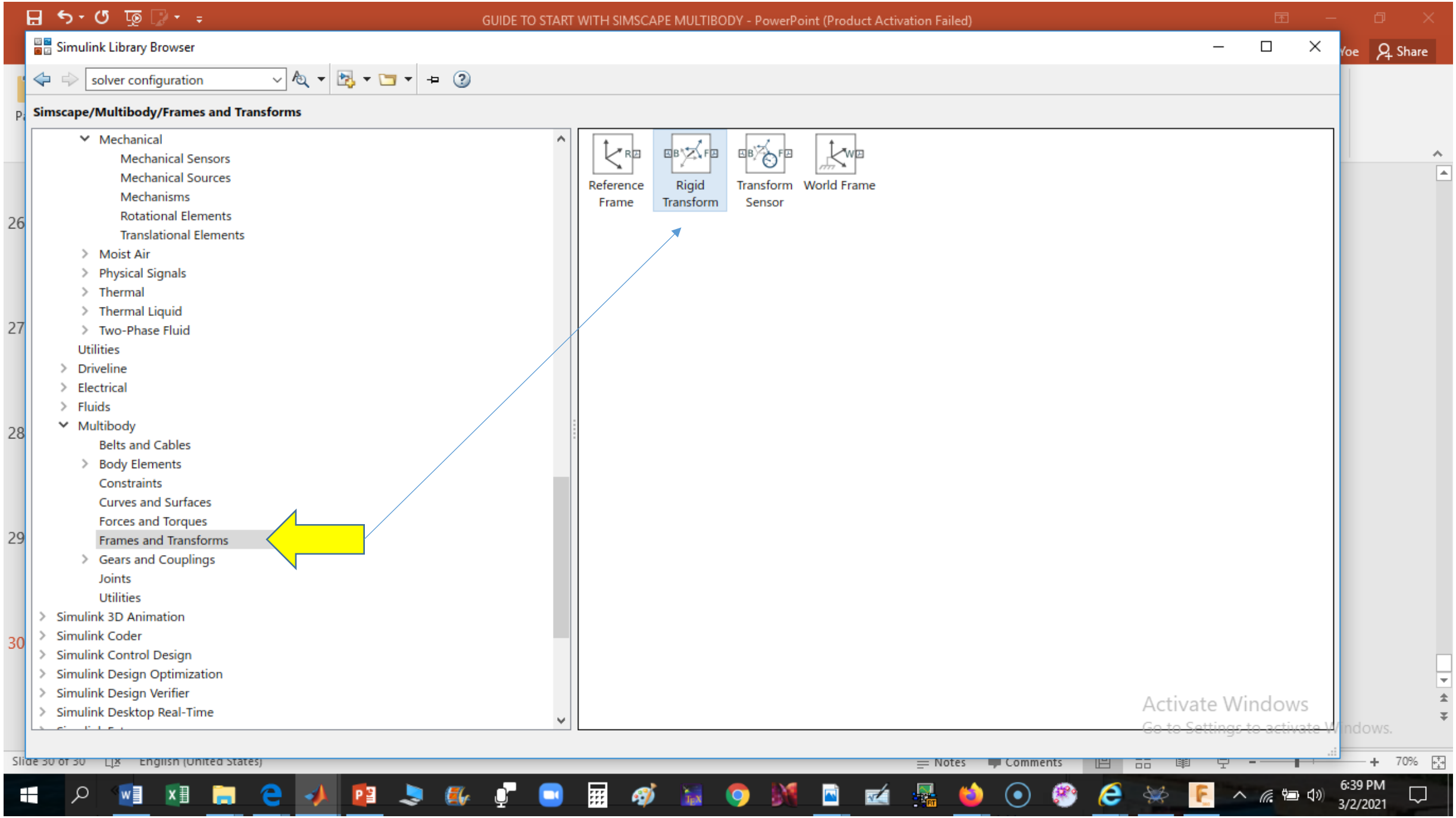
6:40 PM
3/2/2021

NOTE:

We need to define position/orientation of the piece.

For that, we need a Rigid Transform…




GUIDE TO START WITH SIMSCAPE MULTIBODY - PowerPoint (Product Activation Failed)
Simulink Library Browser
solver configuration
Simscape/Multibody/Frames and Transforms
Mechanical
Mechanical Sensors
Mechanical Sources
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Simulink Control Design
Simulink Design Optimization
Simulink Design Verifier
Simulink Desktop Real-Time
Reference Frame
Rigid Transform
Transform Sensor
World Frame
Activate Windows
Go to Settings to activate Windows.
Share
Notes
Comments
70%
6:39 PM
3/2/2021

Rigid Transform : Cuerda L/2

Description

Defines a fixed 3-D rigid transformation between two frames. Two components independently specify the translational and rotational parts of the transformation. Different translations and rotations can be freely combined.

In the expandable nodes under Properties, choose the type and parameters of the two transformation components.

Ports B and F are frame ports that represent the base and follower frames, respectively. The transformation represents the follower frame origin and axis orientation in the base frame.

Properties

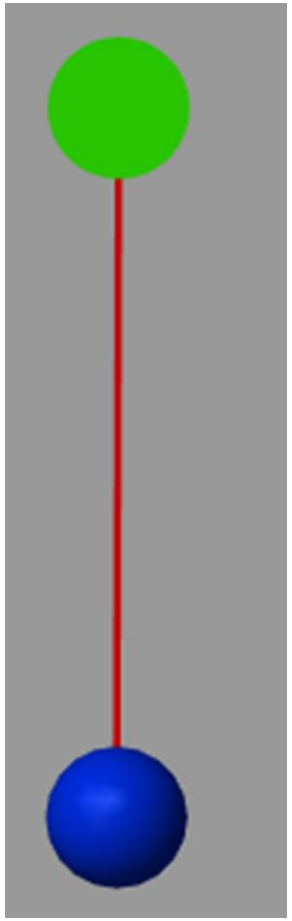
Rotation		
Method	Rotation Sequence	
Rotation Ab...	Follower Axes	
Sequence	X-Y-Z	
Angles	[0 0 0]	deg
Translation		
Method	Cartesian	
Offset	[0 0.5 0]	m

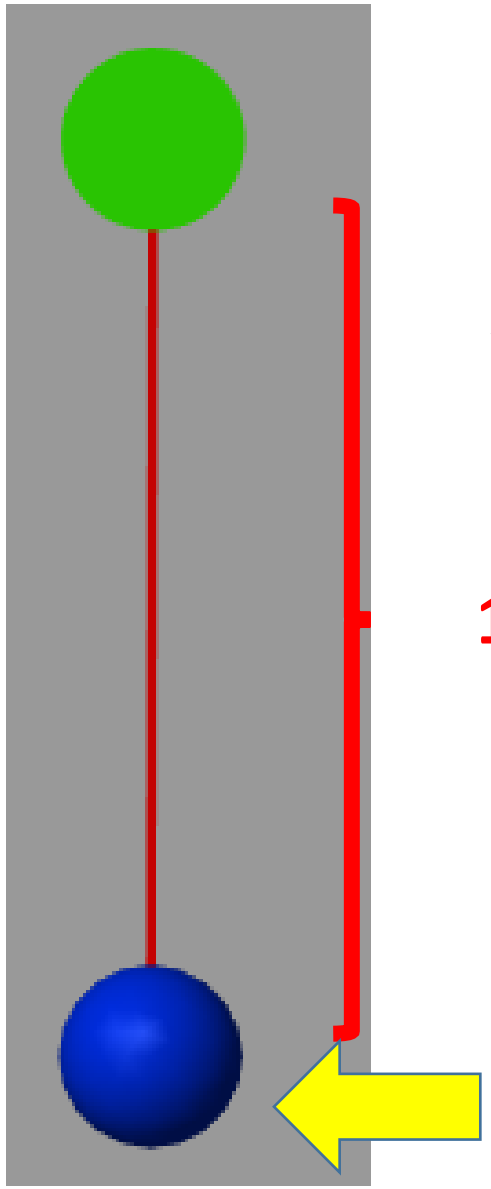
OK Cancel Help Apply

CHOOSE X-Y-Z SEQUENCE WITH NO ROTATION

CHOOSE X-Y-Z SEQUENCE WITH Y-TRANSLATION

We have to add the extreme of the body: the gripper or bob in this case





FIRST, POSITION/ORIENTATION...

1m

Rigid Transform : RigidTransf...

Description

Defines a fixed 3-D rigid transformation between two frames. Two components independently specify the translational and rotational parts of the transformation. Different translations and rotations can be freely combined.

In the expandable nodes under Properties, choose the type and parameters of the two transformation components.

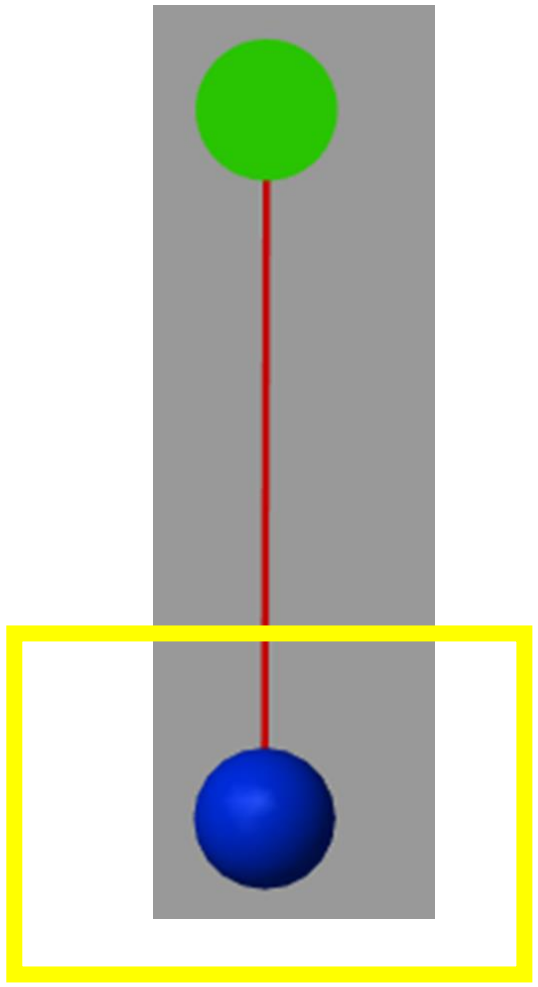
Ports B and F are frame ports that represent the base and follower frames, respectively. The transformation represents the follower frame origin and axis orientation in the base frame.

Properties

Rotation		
Method	Rotation Sequence	
Rotation Ab...	Follower Axes	
Sequence	X-Y-Z	
Angles	[0 0 0]	deg
Translation		
Method	Cartesian	
Offset	[0 1 0]	m

OK Cancel Help Apply

Finally, add the end-effector or the bob in this case



Solid : Masa puntual

Description

Represents a solid combining a geometry, an inertia and mass, a graphics component, and rigidly attached frames into a single unit. A solid is the common building block of rigid bodies. The Solid block obtains the inertia from the geometry and density, from the geometry and mass, or from an inertia tensor that you specify.

In the expandable nodes under Properties, select the types of geometry, inertia, graphic features, and frames that you want and their parameterizations.

Port R is a frame port that represents a reference frame associated with the geometry. Each additional created frame generates another frame port.

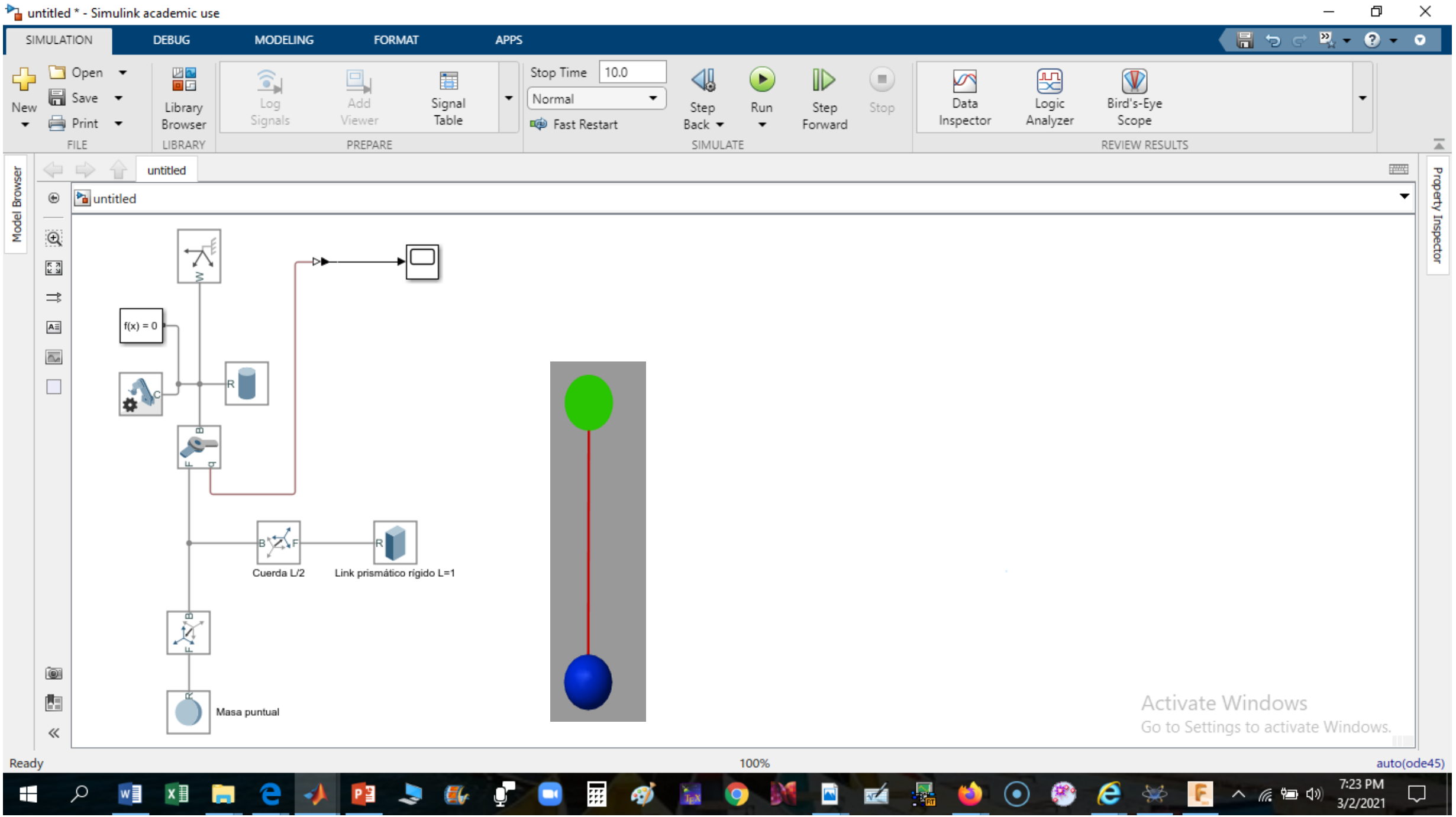
Properties

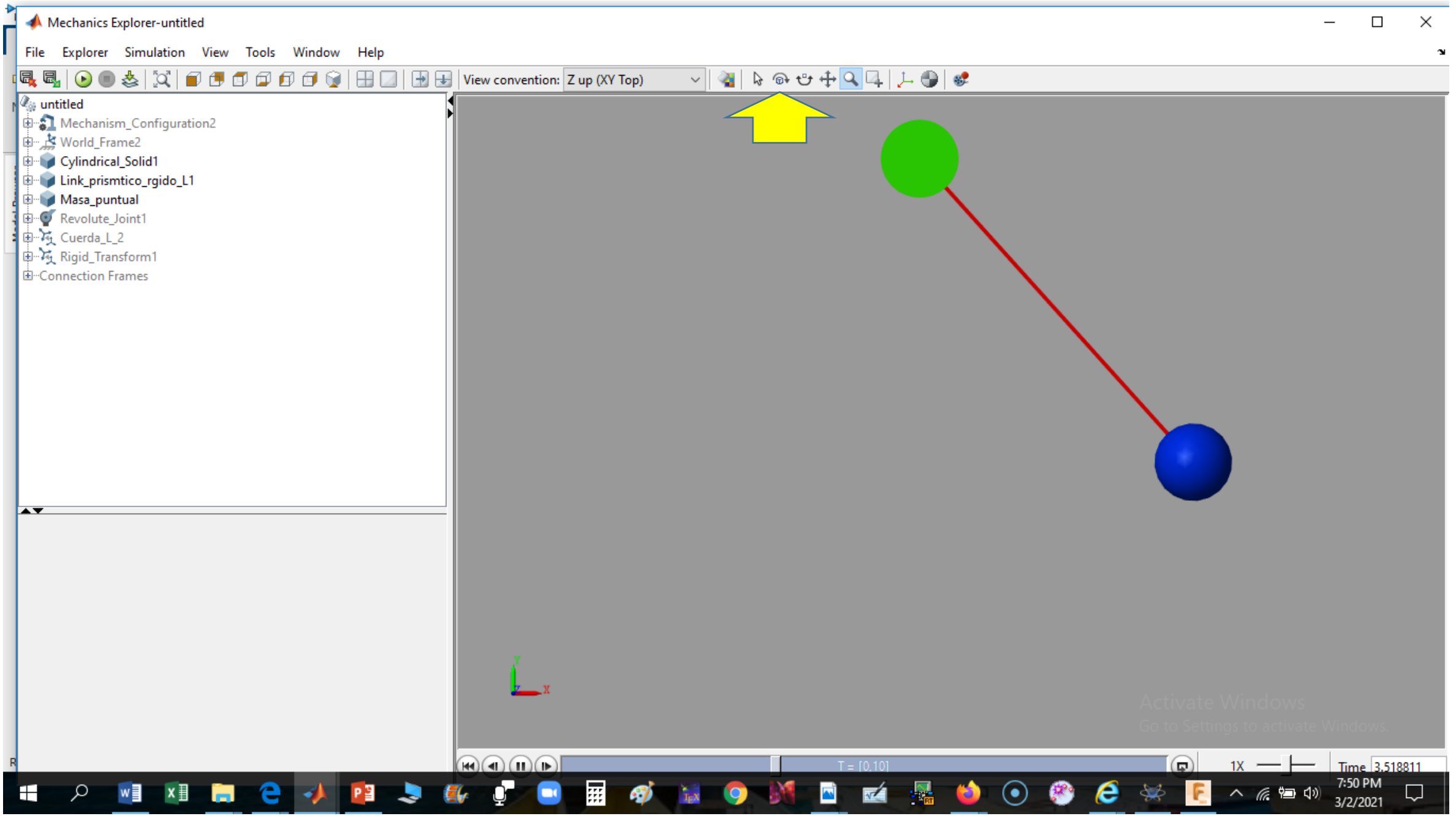
Geometry		
Radius	0.1	m
Export		
Inertia		
Type	Point Mass	
Mass	1	kg
Graphic		
Frames		

OK Cancel Help Apply

RADIOUS

MASS


untitled * - Simulink academic use
SIMULATION
DEBUG
MODELING
FORMAT
APPS
New
Open
Save
Print
FILE
Library Browser
LIBRARY
Log Signals
Add Viewer
Signal Table
PREPARE
Stop Time
10.0
Normal
Fast Restart
Step Back
Run
Step Forward
Stop
SIMULATE
Data Inspector
Logic Analyzer
Bird's-Eye Scope
REVIEW RESULTS
Model Browser
Property Inspector
untitled
f(x) = 0
Cuerda L/2
Link prismático rígido L=1
Masa puntual
Activate Windows
Go to Settings to activate Windows.
Ready
100%
auto(ode45)
7:23 PM
3/2/2021


Mechanics Explorer-untitled
File
Explorer
Simulation
View
Tools
Window
Help
View convention: Z up (XY Top)
untitled
Mechanism_Configuration2
World_Frame2
Cylindrical_Solid1
Link_prismtico_rgido_L1
Masa_puntual
Revolute_Joint1
Cuerda_L_2
Rigid_Transform1
Connection Frames
Activate Windows
Go to Settings to activate Windows.
1X
Time 3.518811
7:50 PM
3/2/2021

Work in teams: Please construct this structure

- 20-25 min