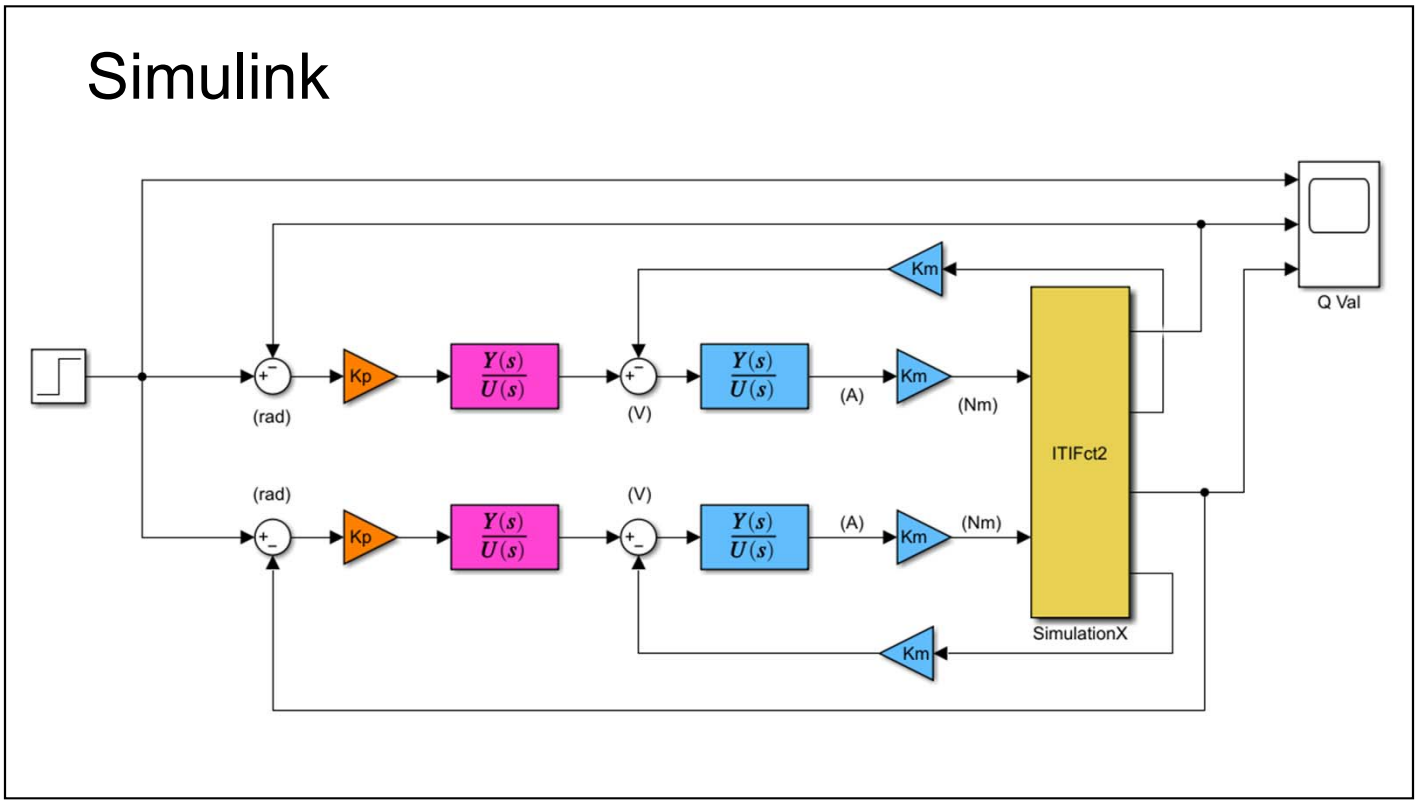
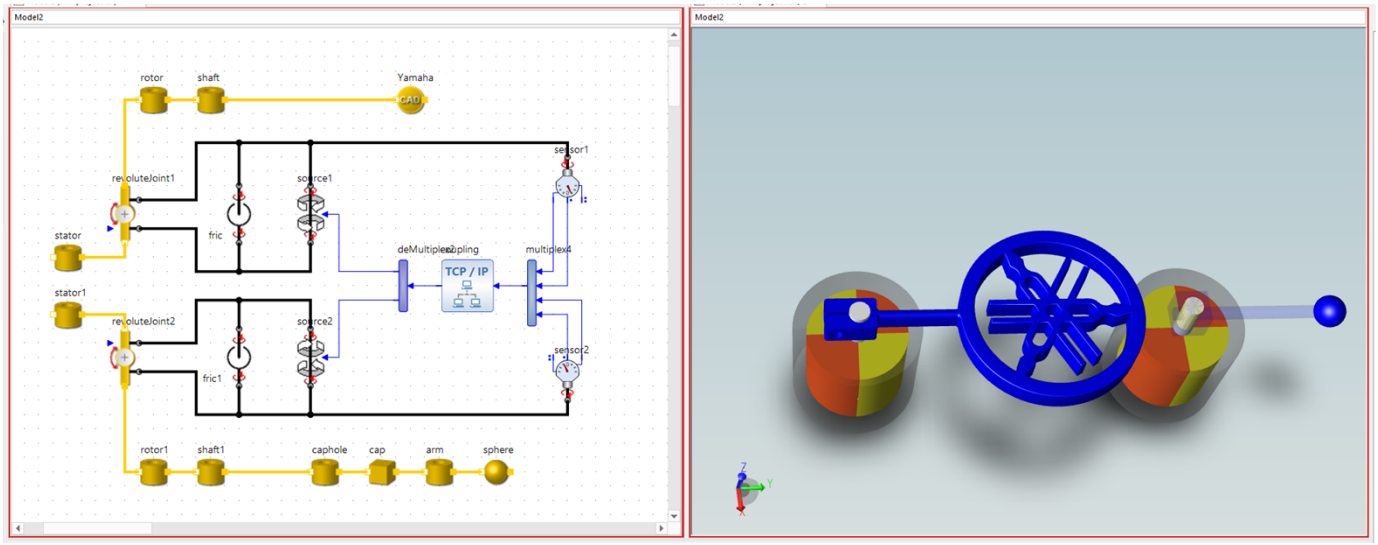


Example System

- 2 identical systems
- Step response

- P-Controller (orange)
- Amplifier (pink)
- Electrical motor model (blue)

Actual & Approx Inertia



Example System

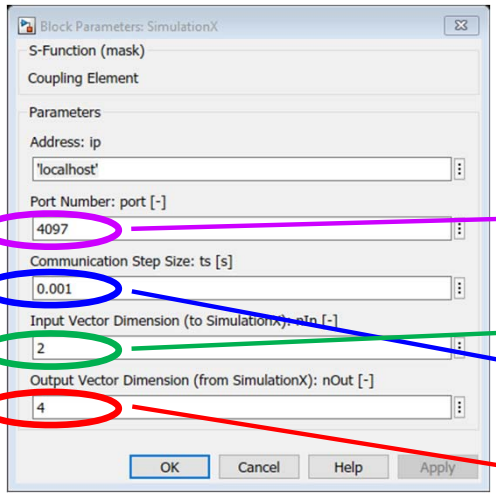
- Yamaha pendulum
- Actual part from SolidWorks
- STL format

- Sphere mass
- Located at COM
- Arm transparent -> no dynamics

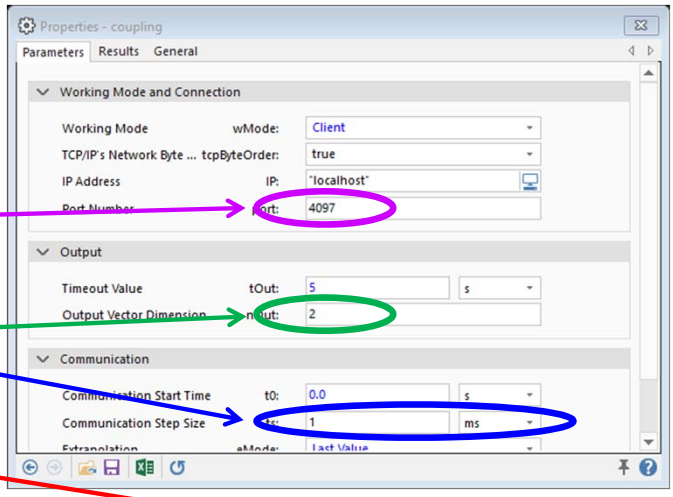
- Identical motor (rotor) dynamics

Co-Simulation

Simulink ITIFct2



SimulationX TCP/IP

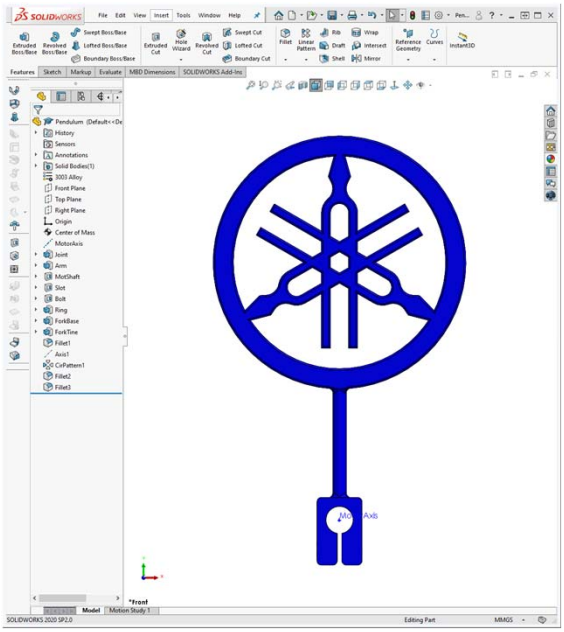


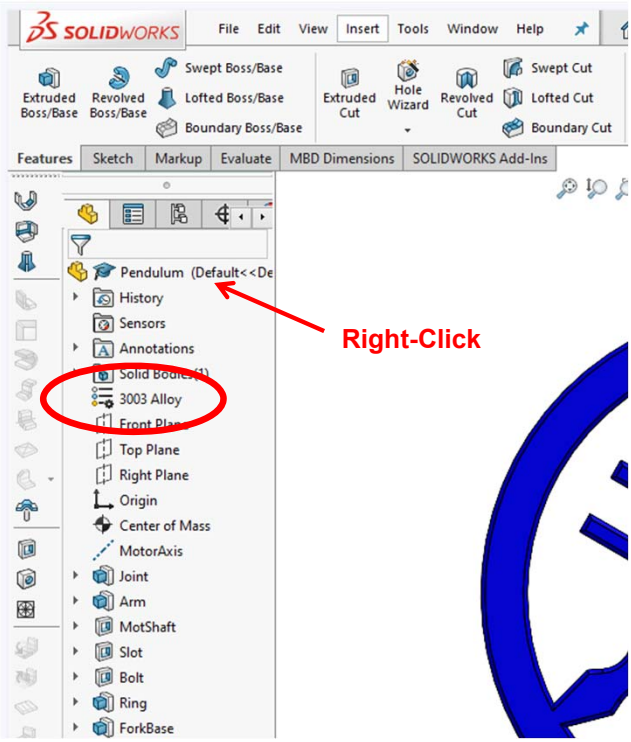
run error if wrong

Display Results

- Drag & drop
- Minor differences in inertia

Material

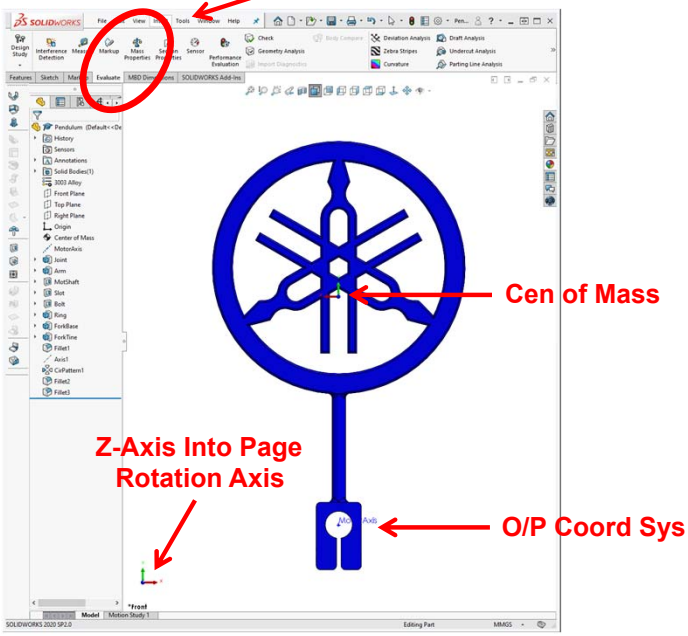


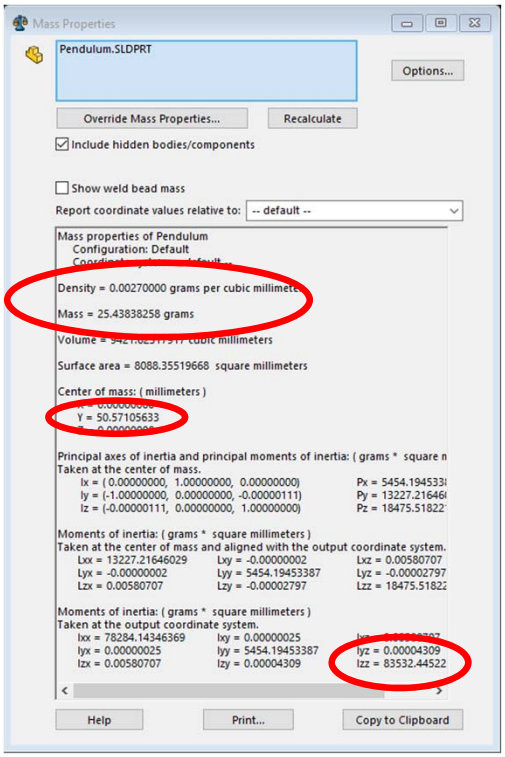


From SolidWorks

- Apply material to part
- Shows up in design tree

Inertia

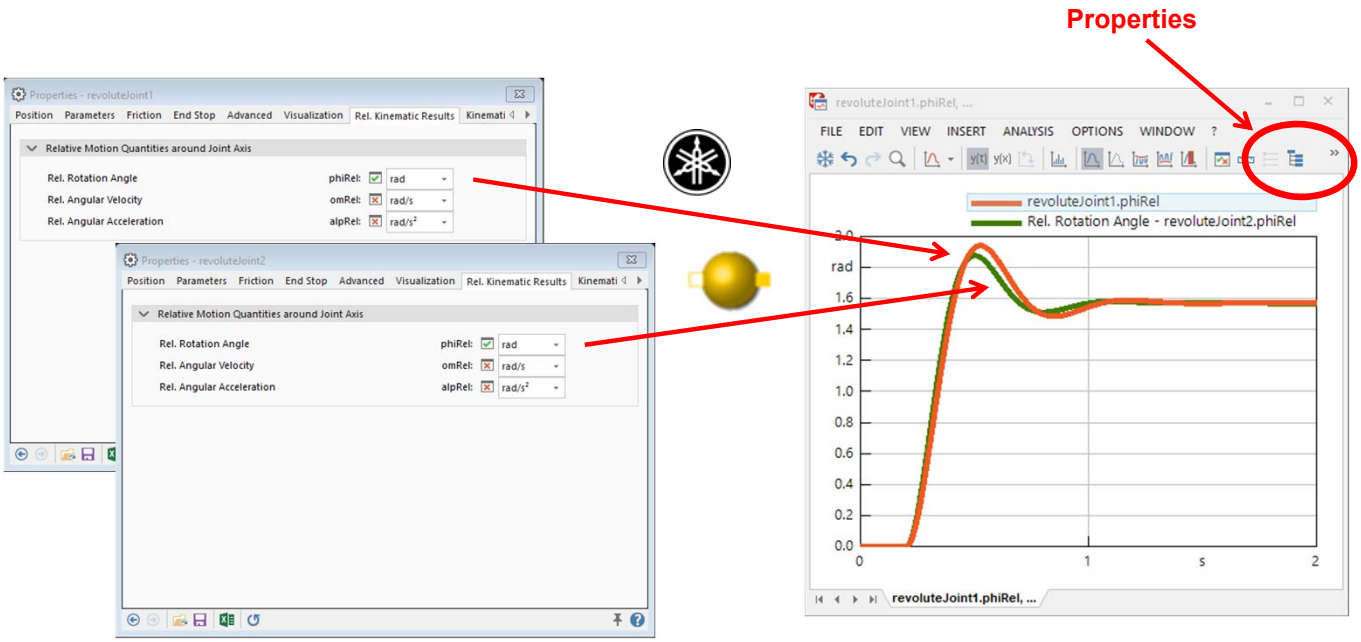




Evaluate Tab

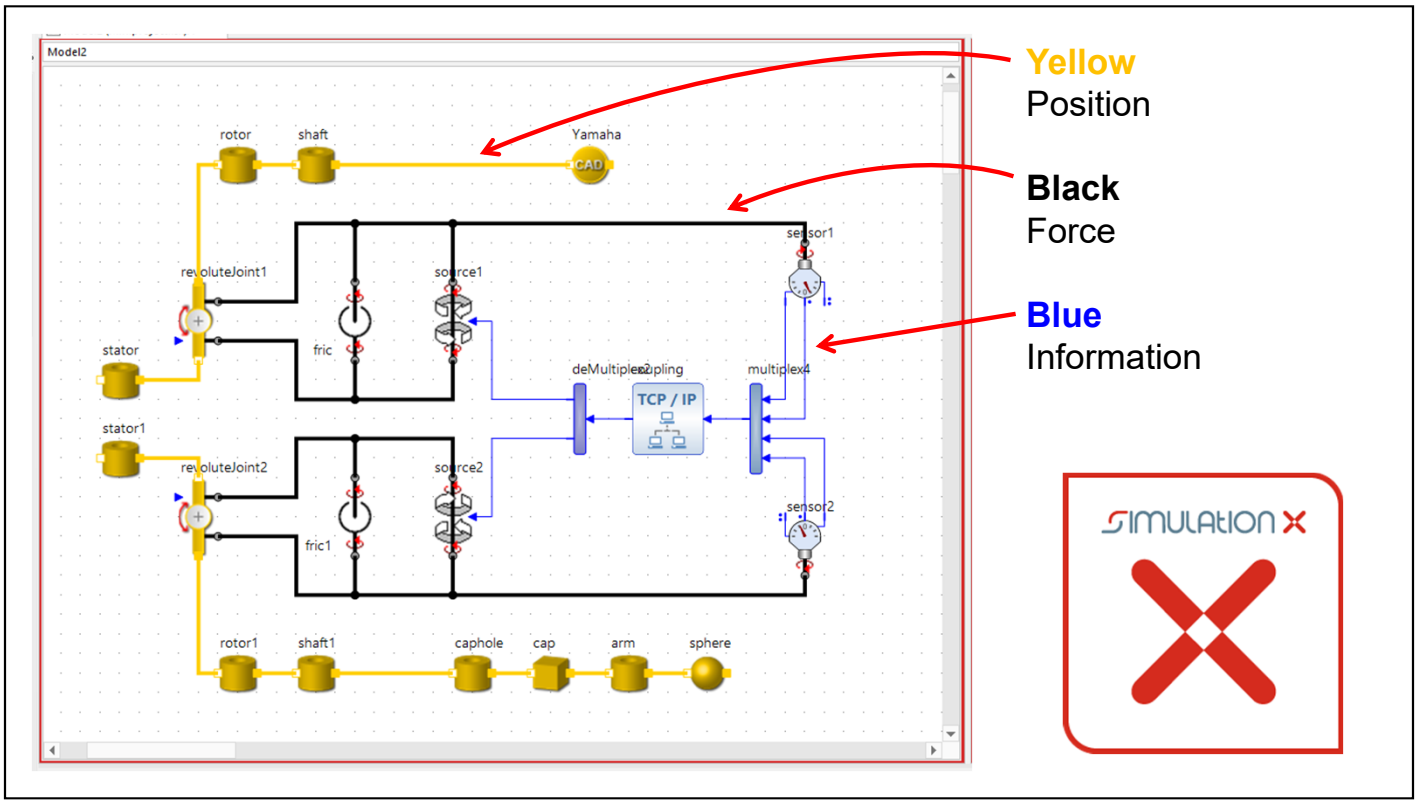
- Model Properties
- Material density
- Mass
- COM
- Inertia Tensors
- Choose co-ordinate centre wisely to get useful info

Results



Display Results

- Drag & drop
- Minor differences in inertia



Position

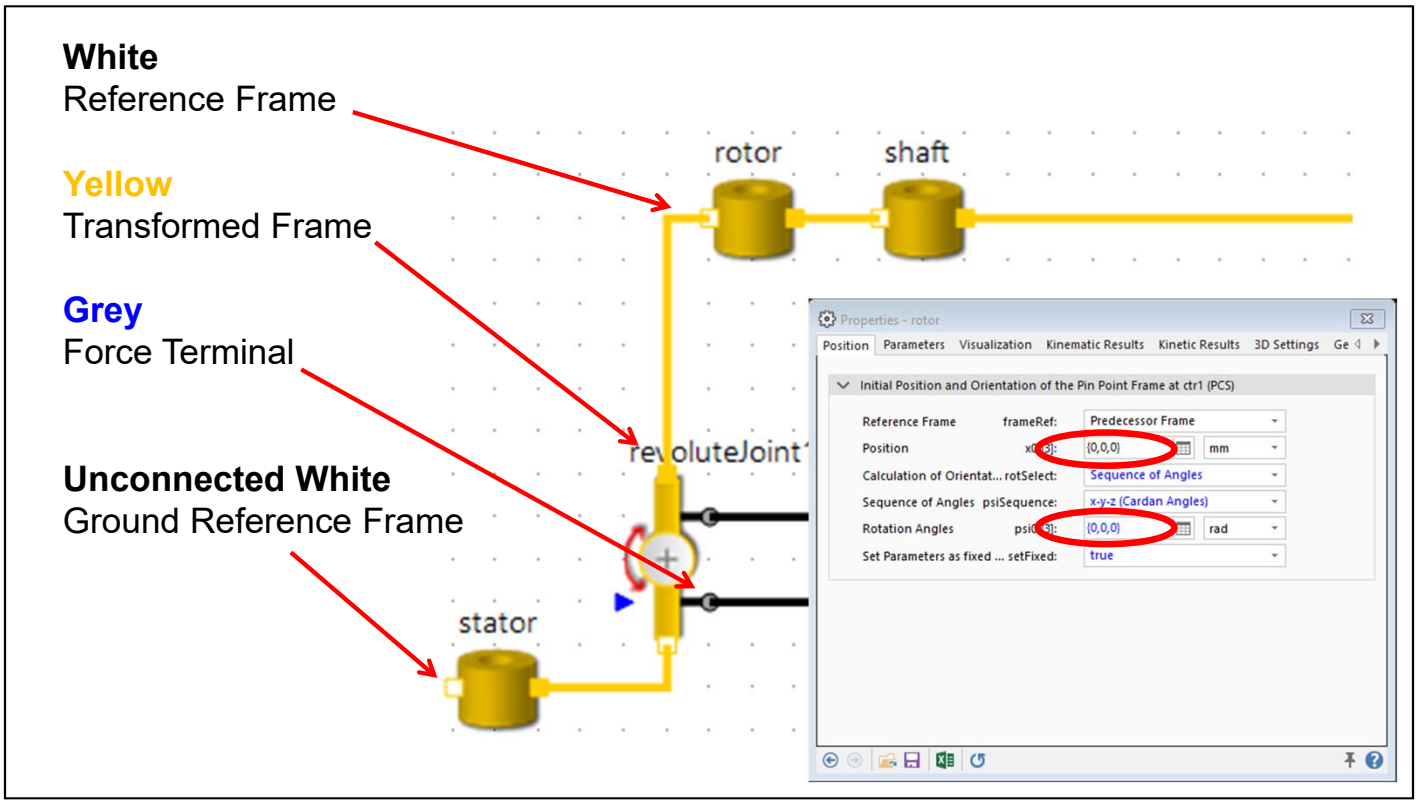
- Location or components
- Predecessor frame + motion / rotation
- Defines system inertia

Force

- Mechanical models
- Not a physical object that you can pick up and hold

Information

- Signals
- Just like Simulink

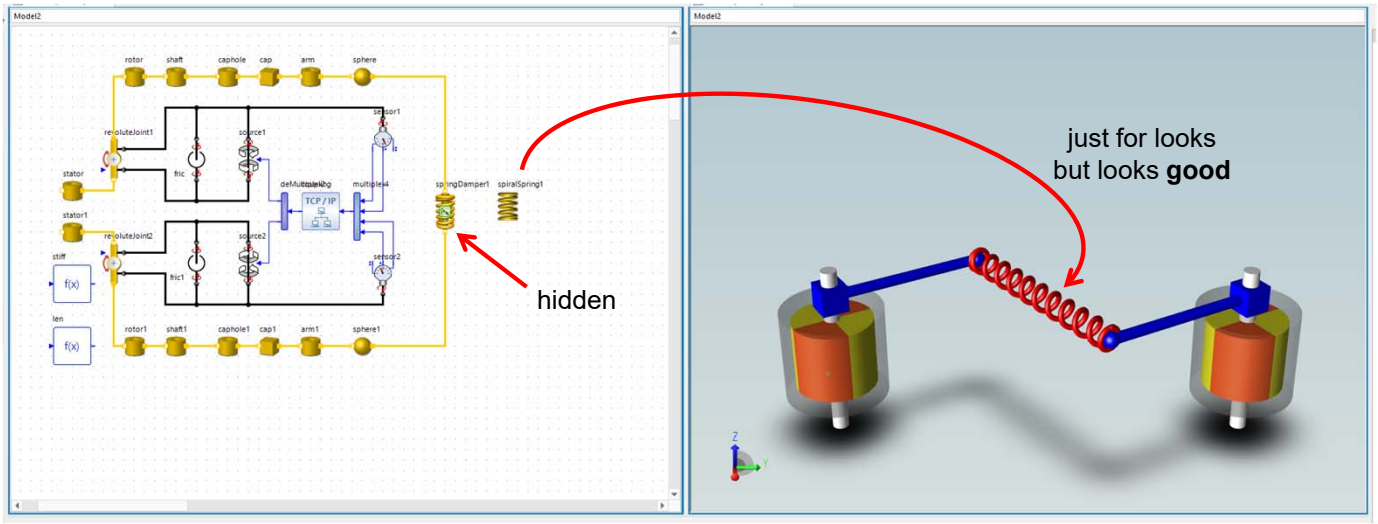


Rigid Bodies

- Reference frame aligns with Transformed frame of previous element
- Position & Rotation Angles Transform frame

Flexible Members & Animation Bodies

White
Reference Frame



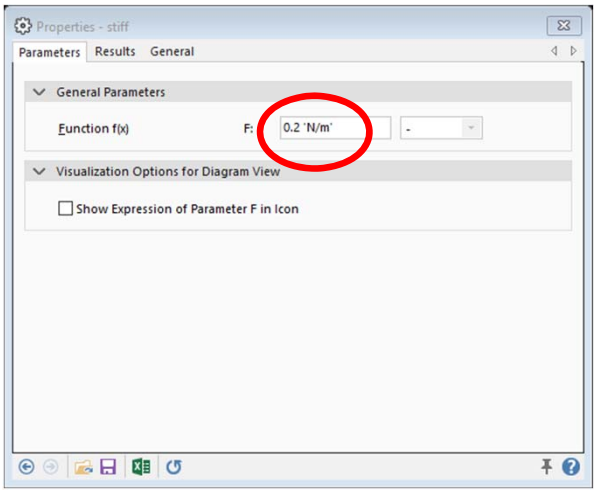
Force Elements

- No fixed length
- 2 Reference Frames (White)
- Reaction force
- Closed kinematic chains

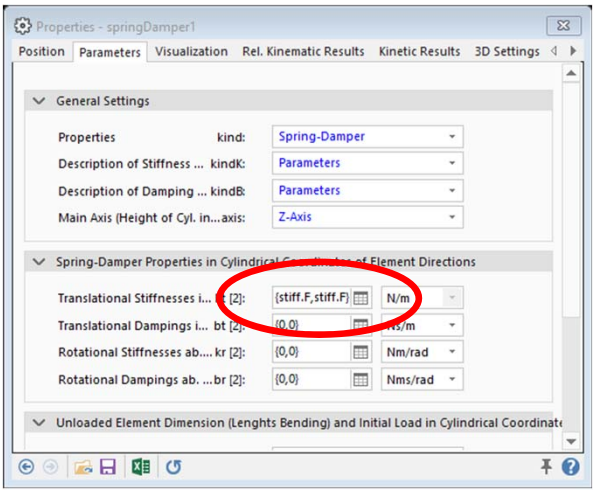
Animation Bodies

- No dynamic effect
- Visual representation only
- No explicit connection (yellow) to model
- Physical spring hidden

Function Properties



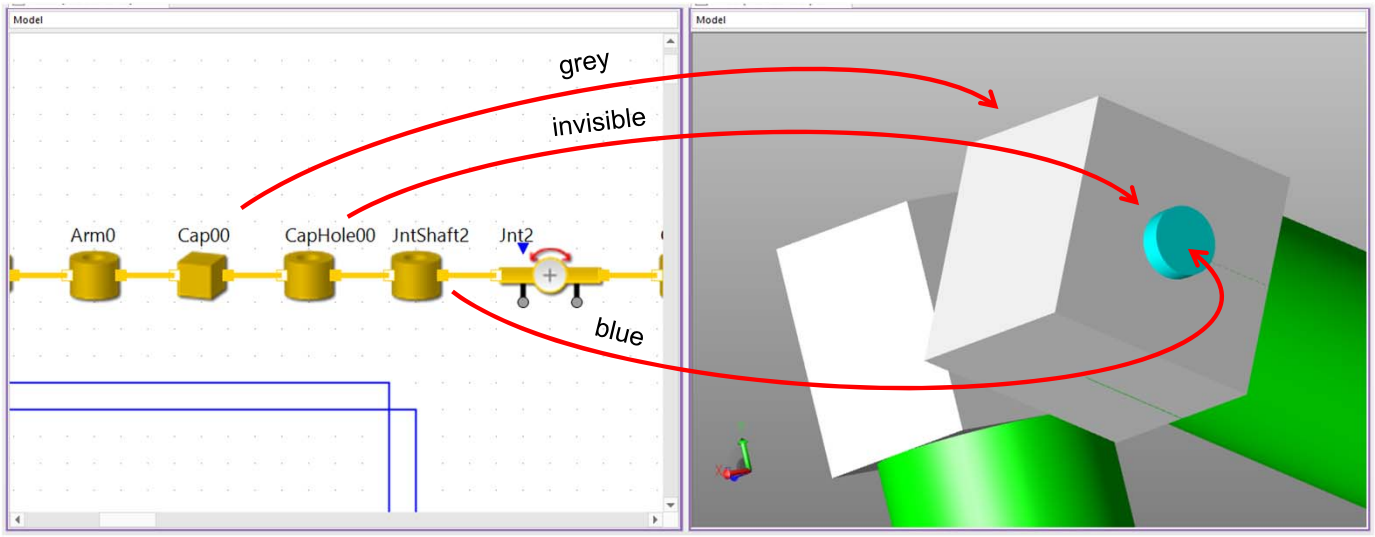
Body Properties



Useful When

- Parameter used in multiple places
- Design parameter

Holes

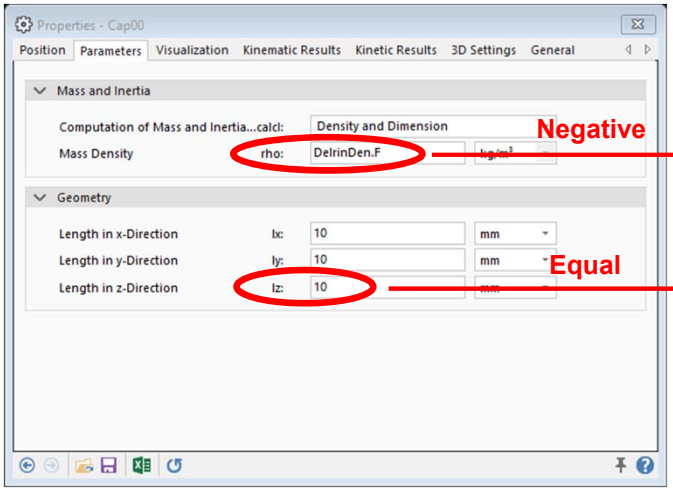


Hole

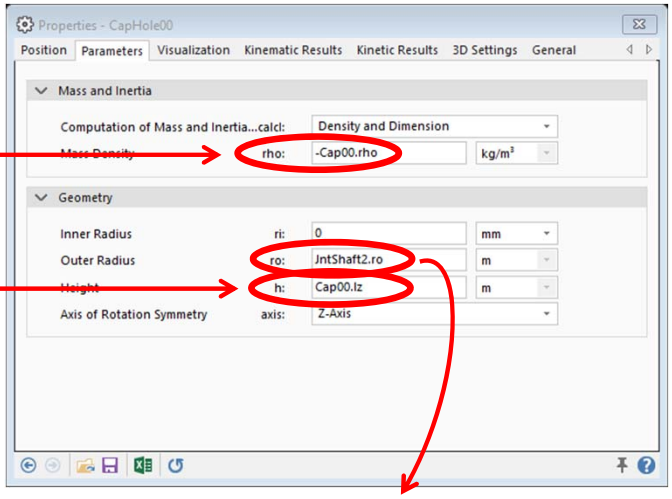
- Remove inertia from system
- Shaft not same material as Cap

Holes

Cap



Hole



Negative

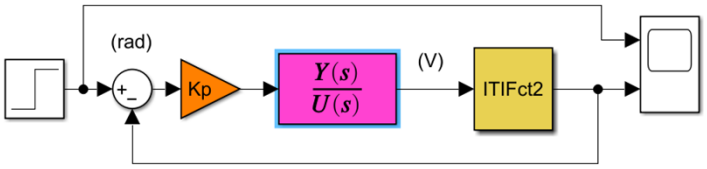
Equal

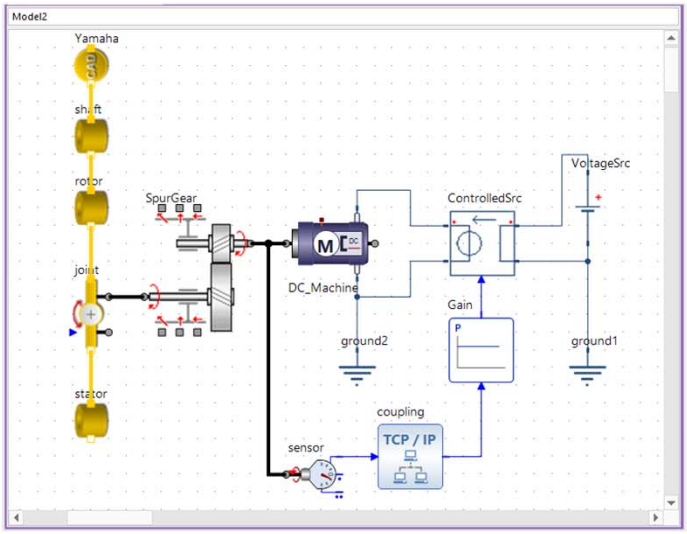
Same radius as shaft

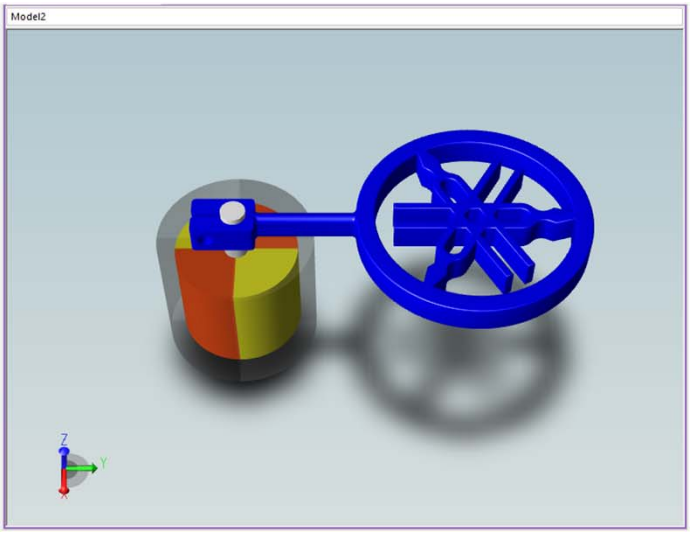
Hole

- Remove inertia from system
- Shaft not same material as Cap

Gear Sets







Spur Gear

- Power Transmission (1D) / Transmission Elements
- Reverses direction
- Specify losses

DC Machine

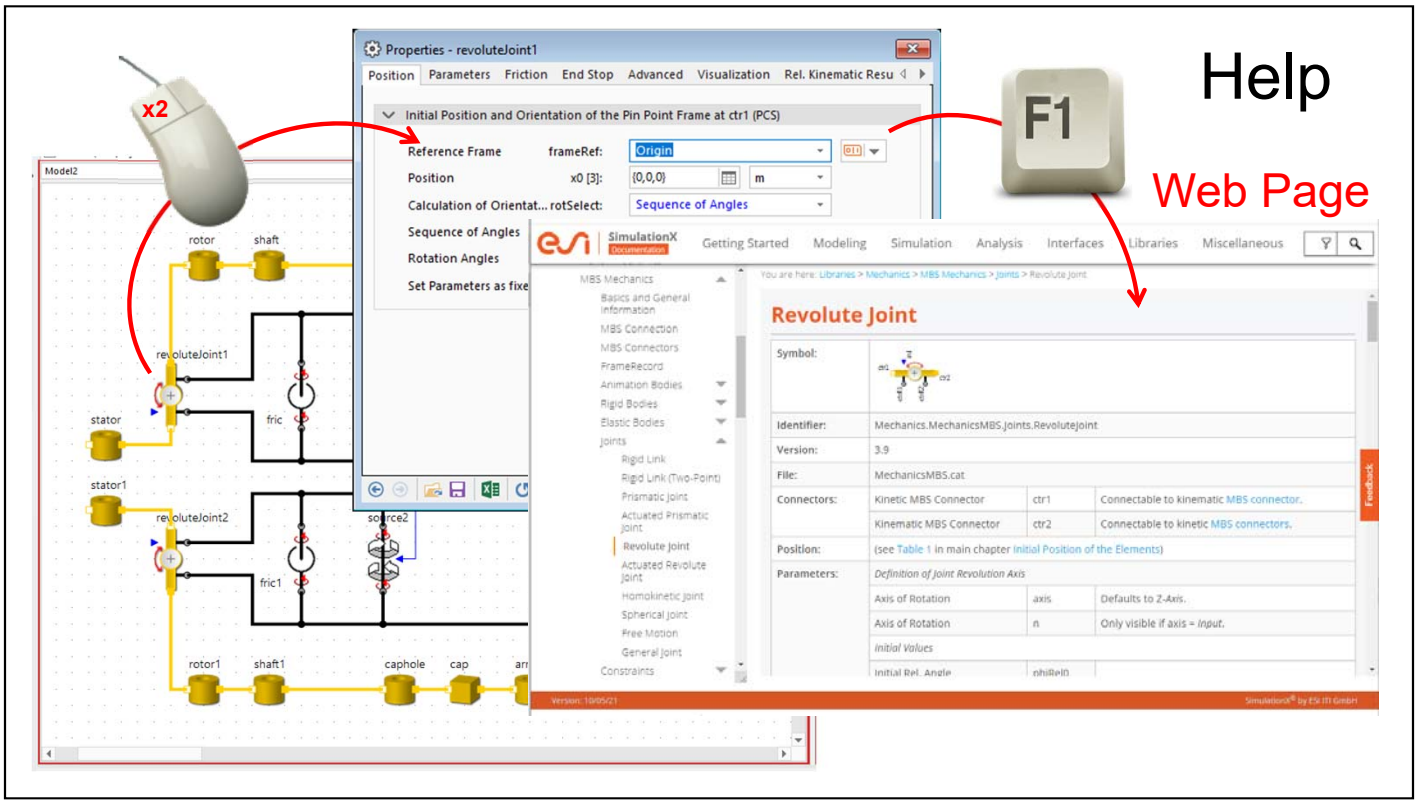
- Electro-Mechanics / Electric Machines / DC Machine
- Ground 1 terminal to avoid singularity

Controlled Voltage Source

- Electrical and Electronics / Analog / Basic Elements / Linear VCVS
- Electrical and Electronics / Analog / Sources / Voltage Source
- Ground 1 terminal to avoid singularity

Gain

- Signal Blocks / Linear Signal Blocks / Proportional Gain (P Gain)
- VCVS scales input by Voltage Source value (12 V)
- Divide by 12V to compensate



Getting Help

- Double-click what you are interested in
- Press F1
- Web-Page appears

- Other topics on left
- Search bar above