MULTIBODY DYNAMICS SIMULATIONS USING

Altair | HyperWorks® 14.0

Soheil Fatehiboroujeni
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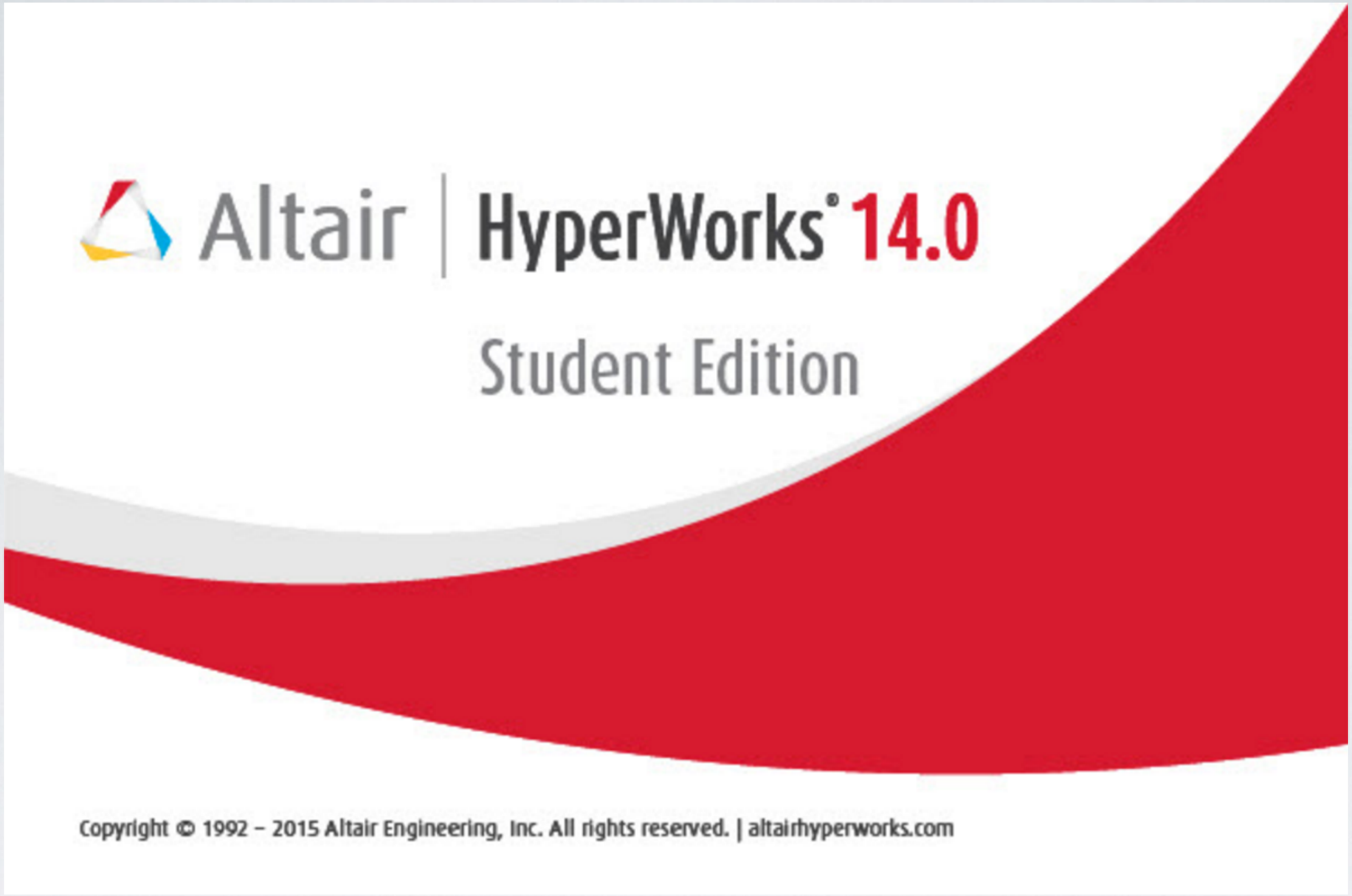
UCMERCED | SCHOOL OF ENGINEERING

SUMMARY & OUTCOMES

- We learn the basics of multibody dynamics simulations using Hyperworks, Motion View.

- We learn how to build models in graphical interface.

- We learn how to build models using MDL syntax to automate the process.



Please follow the instructions to get the free student version in a Windows OS

Go to installation

REFERENCE FOR MOTION VIEW

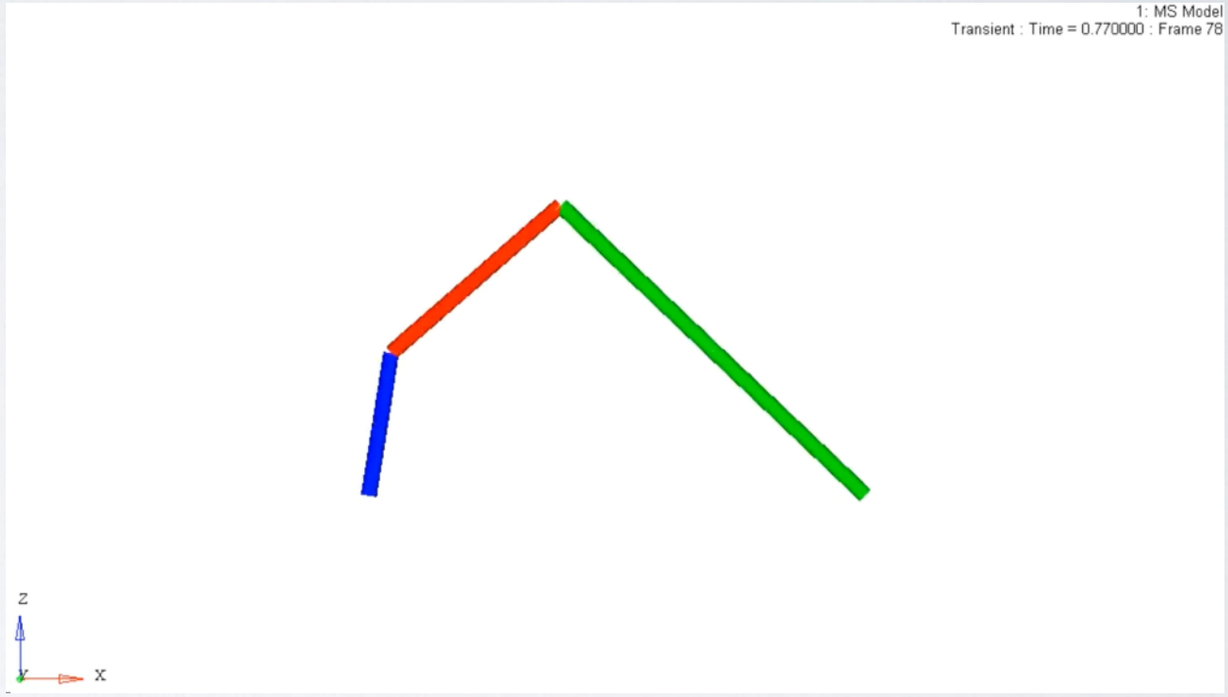
- Chapter 5 of the free altair ebook link
- Hyperworks online help

- Send me an email if you need any help getting the software and other materials.
- I will update you with a pre-workshop exercise soon!

Thank you.

PRE-WORKSHOP EXERCISE

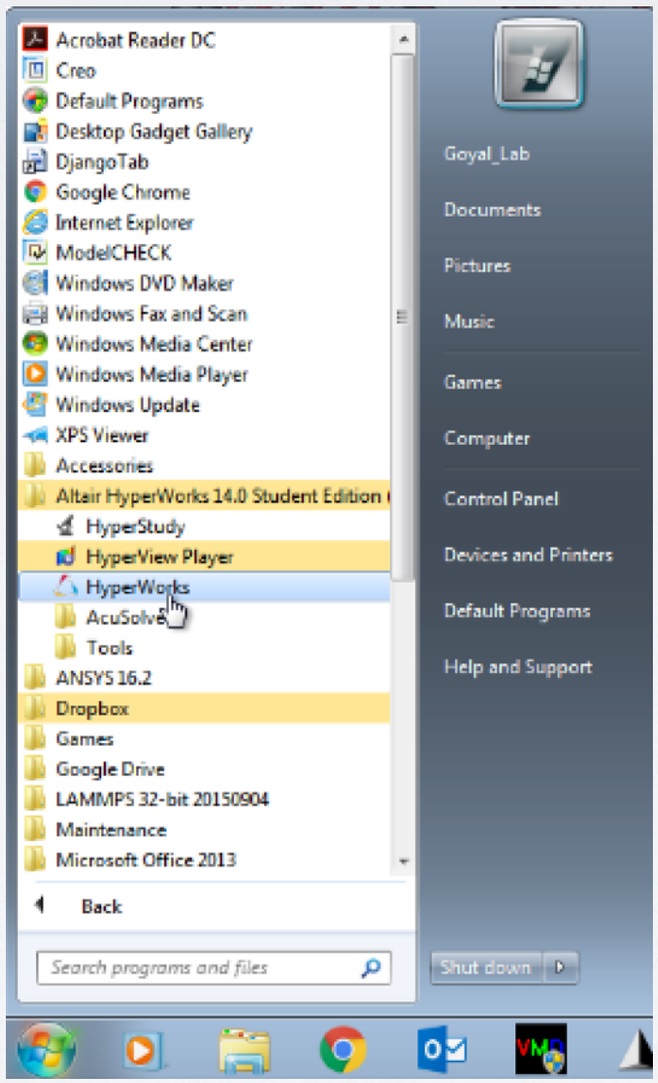
4-bar Linkage Mechanism



- Get to know the graphical interface.
- How to define **points**, **bodies**, **joints**, and **graphics** of the bodies.
- How to define **inputs** (external forces or imposed motion) and **outputs** (position vectors).

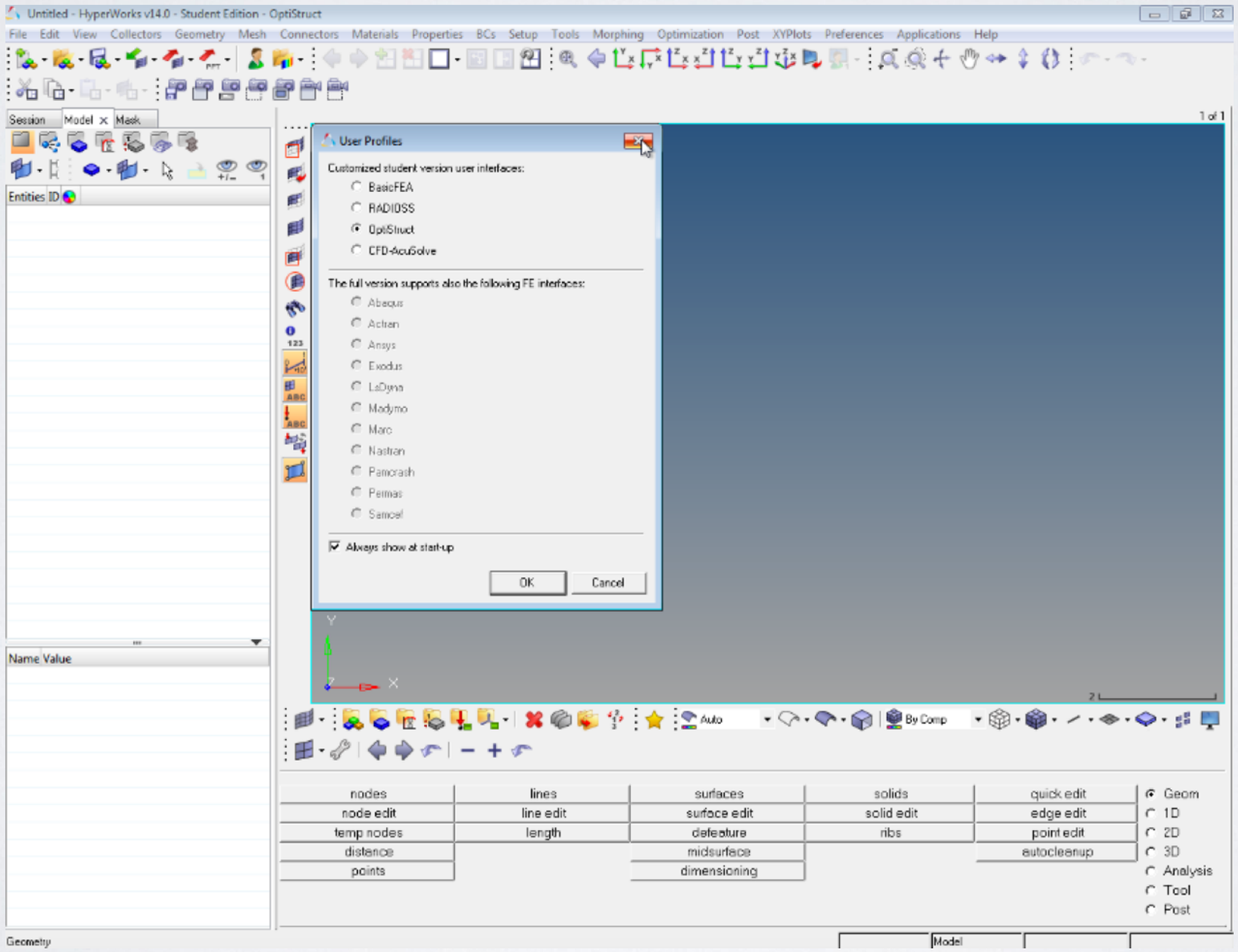
STEP 1

- After installing Hyperworks, open the program from your start menu.



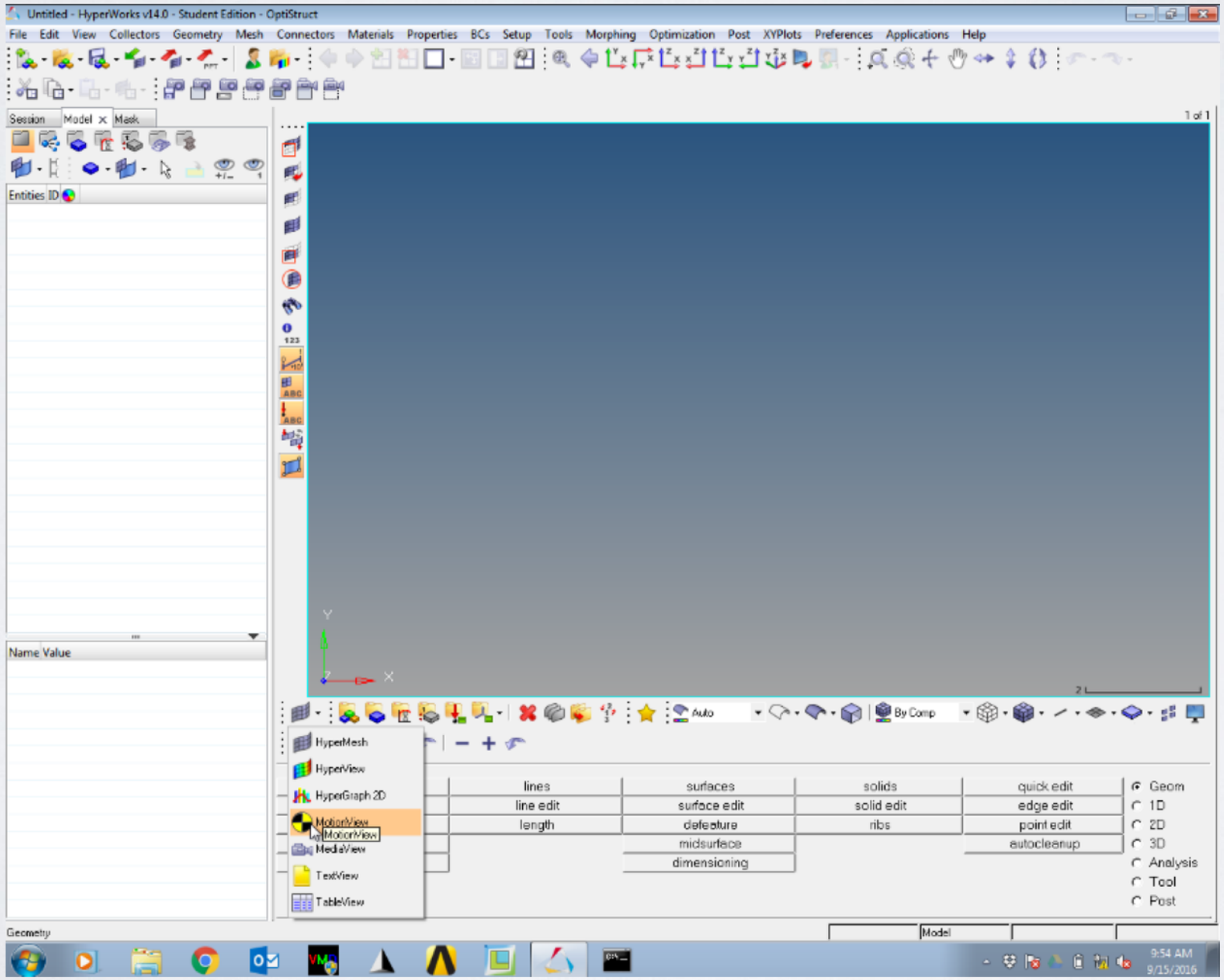
STEP 2

- Close this upcoming message.



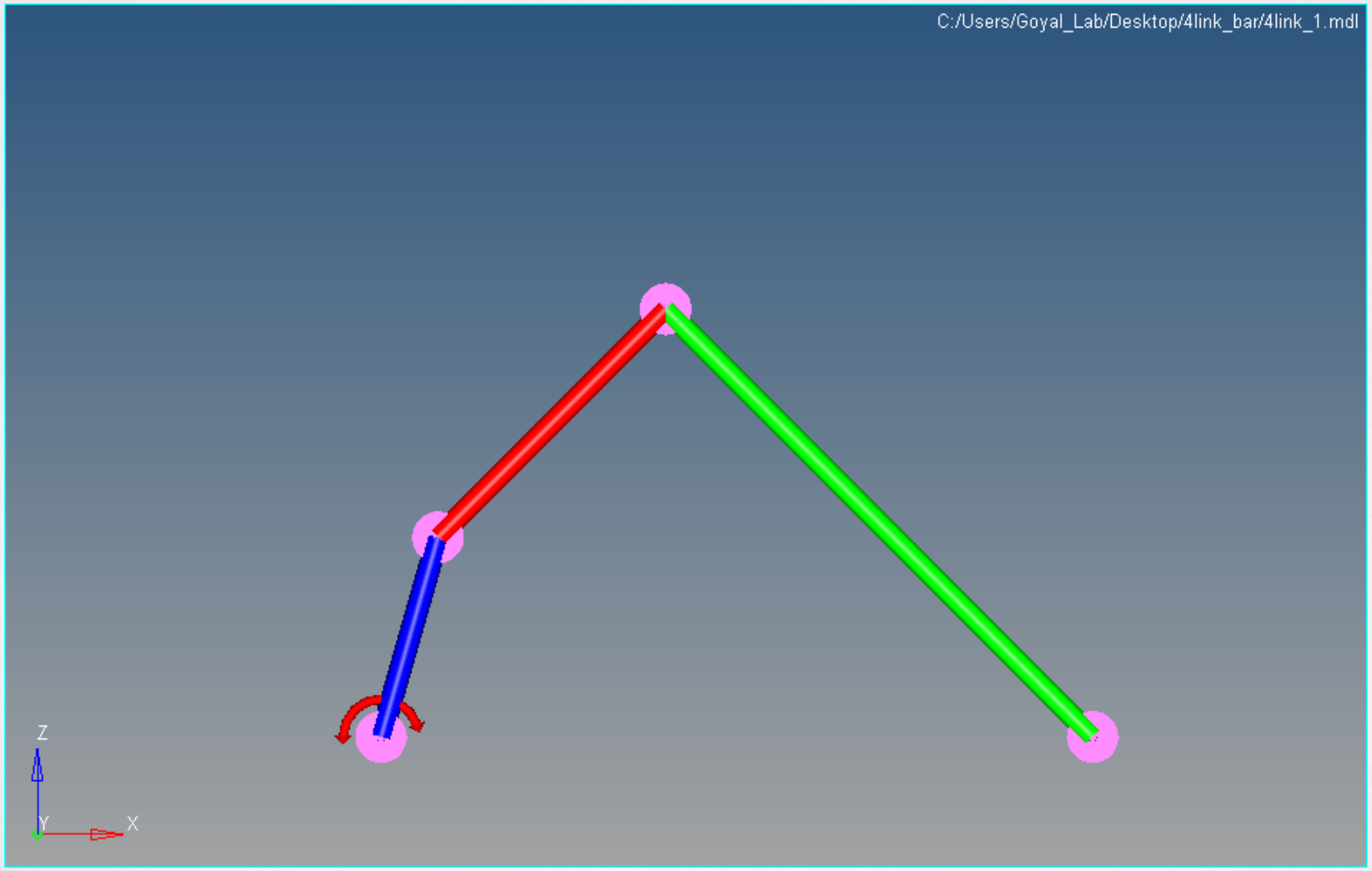
STEP 3

- Go to MotionVew environment from the dropdown menu right underneath the coordinate system.



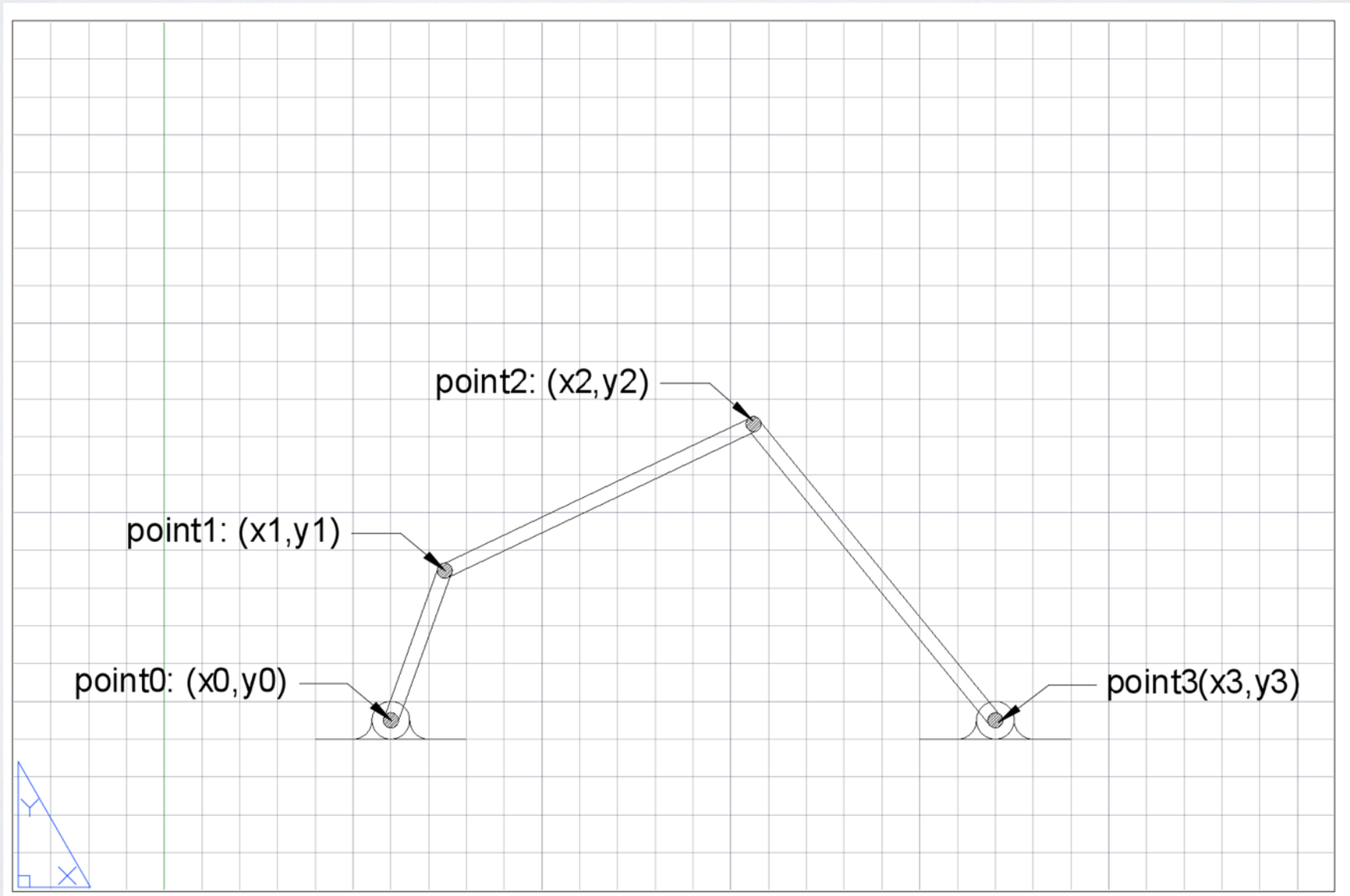
STEP 5

- Use this tutorial (goo.gl/QAcpa4) to reproduce the 4bar linkage example.



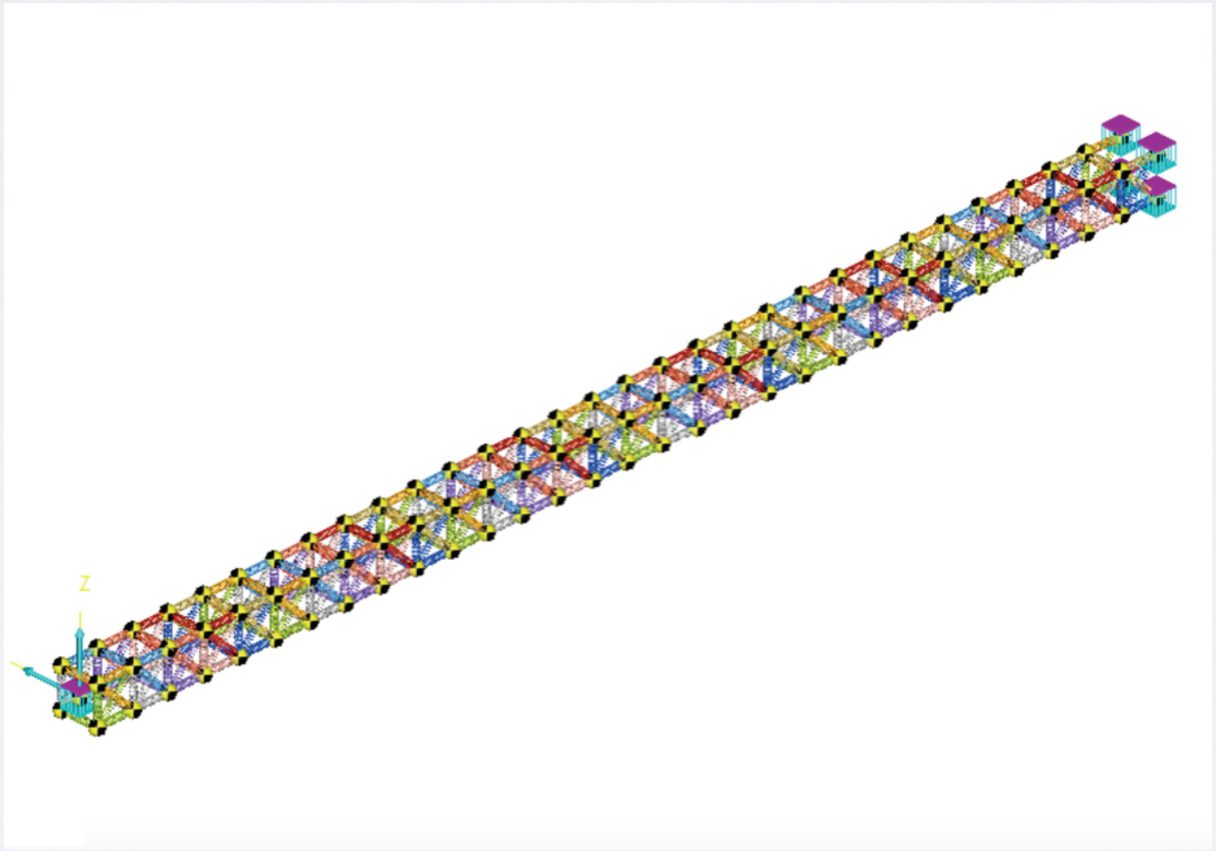
(EXTRA) STEP 6

- Write the Holonomic constraint of the system such that:
  - Left hand side is the size of the link "point1 to point2" which is a known constant.
  - Right hand side is the size of the vector from "point1 to point2" in terms of angular position of link "point0 to point1" (call it *theta*) and angular position of link "point3 to point2" (call it *psi*). Notice that length of these two links will come into the picture as well.
- Use the Matlab "fzero" command (or another solver) to find *psi* for an entire revolution of *theta* and benchmark the MotionView results with yours.



- Send me an email if you need any help.

- At the workshop we will use Matlab to create a slender structure with point masses and springs similar to what is explained in this paper.



Looking forward to see you.