Mechanism Design Lab 1

BMM4723

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Lab Outcomes

- Introduction ot SAM 6.1 (Synthesis and Analysis of Mechanisms)
- Familiarize with function of SAM
- Draw kinematic diagrams in SAM
- Perform analysis using SAM

Trial version downloadable from

http://www.artas.nl/attachments/article/26/sam61us_setup.exe
WWW.ARTAS.NL > DOWNLOAD

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PART I

http://energyfkmump.weebly.com/download.html

Google: esfog ump

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SAM 6.1

- Interactive software package for design and analysis (motion and force) and optimization of arbitrary planar mechanism.
- Mechanisms can either be generated via design wizards or from can be assembled from basic components.

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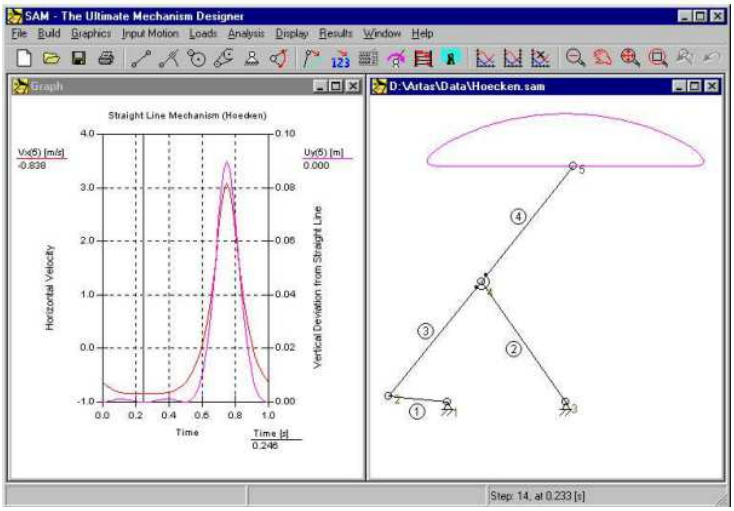
Typical screenshot of a mechanism design session



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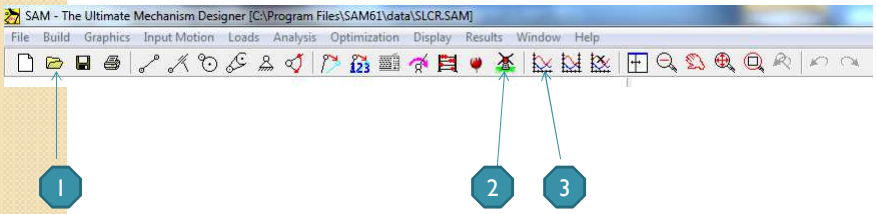
Running a project

1. Open existing mechanism project
2. Animate mechanism
3. View analysis results



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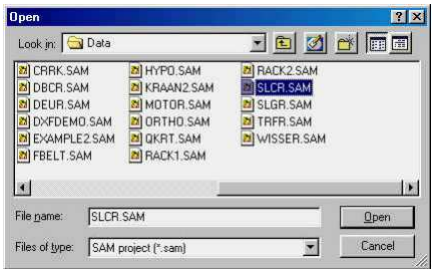
Quick example

- Open Data> SCLR.sam



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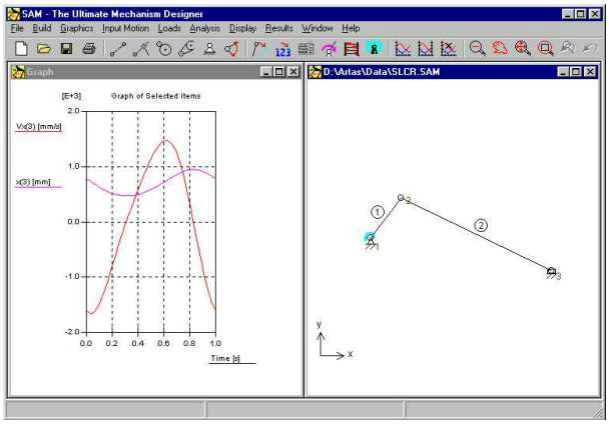
- Sample of 2 beams/links with a slider
- Sample will be loaded and screen shows similar graphics as below



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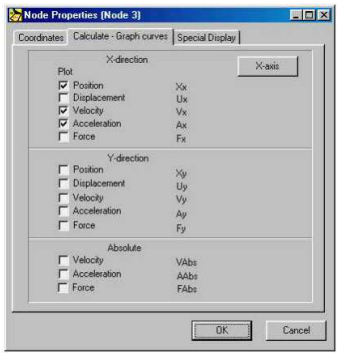
- Choose "Select " for the result of the selected node to be displayed. (e.g Node 3-slider)
- At node properties window at X-direction section, tick position, velocity and acceleration. Click OK.



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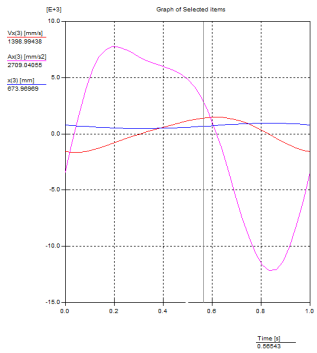
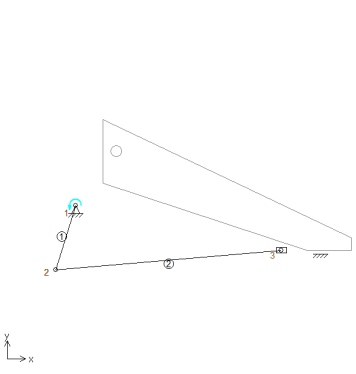
- Click to run/stop the animation of the mechanism
- Can manually animate by moving mouse cursor along the graph





Location of current / intantaneous analysis

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Building a new mechanism

These quick steps provide an overview of how to use SAM to create a mechanism

1. Create new project
2. Assemble mechanism from basic elements
3. Define support conditions
4. Define inertia's, external forces and gravity from the Force menu
5. Specify the input motion(s)
6. Analysis
7. Animate mechanism
8. View analysis results
9. Save project

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Example of 2 links mechanism with slider

- Toggle layout modes  to mechanism layout
- Go to Display > Options > Uncheck "Grid" box, click OK to have grid turn on.
- Select Beam  to start creating beam elements.
- Click 2 points in the mechanism sheet to define linkage and length of the link of the 1st beam.
- Repeat step above to create 2nd link which connected to node 2.
- To set support condition at linkage/node 1 and 3, click  and move around cursor to get suitable type of fix node.
- Select Angle from Input Motion  and click on Node 1. Click "Add" and OK.
- Select Animation  to animate the mechanism

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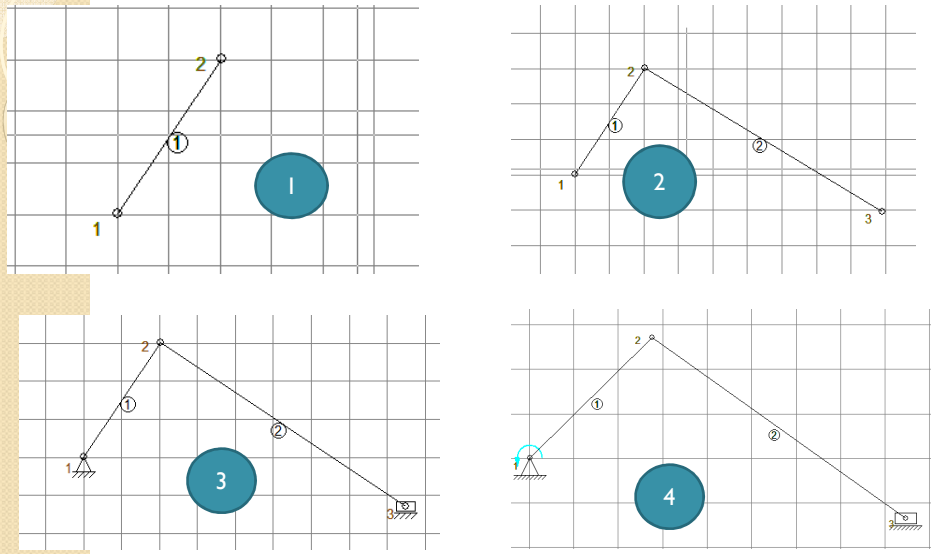

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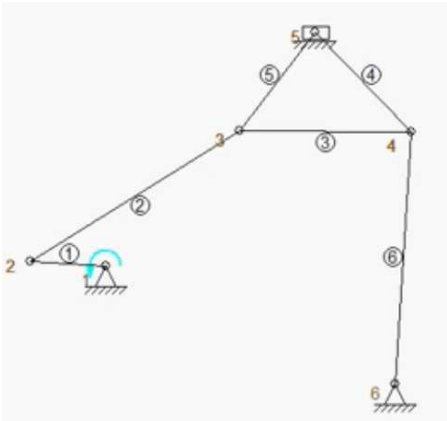
Assignment 1

- Draw mechanism as shown below. Driving link of link 1 should be able to displace 360 degree. Show results for node 5. Dimensioning is not necessary for this task.



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