



Altair

HyperWorks

Altair MotionView 2019 Tutorials

MV-5000: Rigid body Animation - Basic

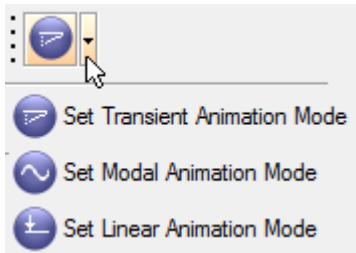
MV-5000: Rigid body Animation - Basic

Introduction




In this tutorial, you will learn how to:

- Use some features available for post-processing animation results in HyperView
- Control the display of the simulation results using Entity Attributes

HyperWorks animation functions allow you to view your model in motion. The three animation types include transient, linear, and modal. You can select the animation type from the animation types drop-down menu.





Animation types menu





	<p>Transient</p>	<p>Transient animation displays the model in its time step positions as calculated by the analysis code. Transient animation is used to animate the transient response of a structure or multi-body system.</p>
	<p>Linear</p>	<p>Linear animation creates and displays an animation sequence that starts with the original position of the model and ends with the fully deformed position of the structure or multi-body system. An appropriate number of frames are linearly interpolated between the first and last positions. Linear animation is usually selected when results are from a static analysis.</p>
	<p>Modal</p>	<p>Modal animation creates and displays an animation sequence that starts and ends with the original position of the structure or multi-body system. The deforming frames are calculated based on a sinusoidal function. Modal animation is most useful for displaying mode shapes.</p>

Multi-body Analysis Types, Animation Mode Settings, and File Types

The tables below show the animation analysis types, mode settings, and the model and results file types required to animate MotionSolve and Adams results.

Multi-body Analysis Type	Animation Mode Setting	Parts in Model	Model File	Results File
Transient/Static/Quasi-Static	 Transient	Rigid or Flexible Bodies	H3D	H3D
Linear	 Modal	Rigid or Flexible Bodies	H3D	H3D

Animation Information for MotionSolve Results



Multi-body Analysis Type	Animation Mode Setting	Parts in Model	Model File	Results File
Transient/Static/Quasi-Static	 Transient	Purely rigid	GRA	GRA
Transient/Static/Quasi-Static	 Transient	One or more flexible bodies	FLX	FLX
Linear	 Modal	Purely rigid	GRA	RES
Linear	 Modal	One or more flexible bodies	FLX	FLX

Animation Information for Adams Results

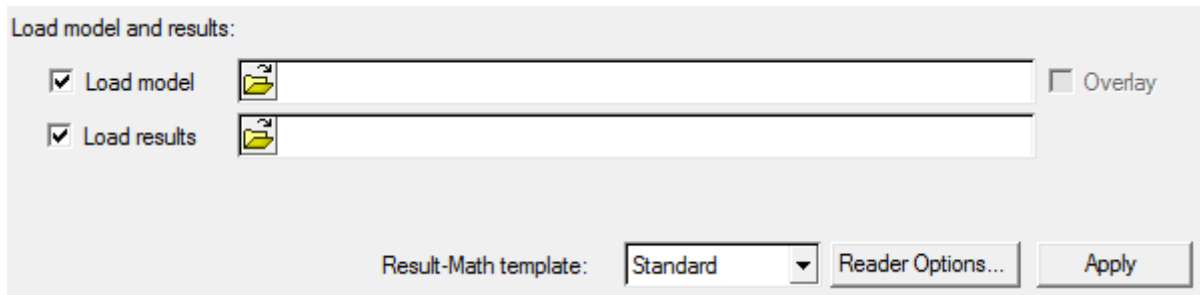
Step 1: Viewing and Controlling Animation Files.

In this exercise, you will view and control the pendulum animation based on the files output by **MotionSolve**.





Note Copy all of the h3d files located in the `mbd_modeling\animation` folder to your <working directory>.

- From the **File** menu, select **New > Session** to start a new session.
If a warning message is displayed, asking if you want to discard the current data, click **Yes** to continue.
- Click the **Select application** drop-down menu,  , from the toolbar, and select **HyperView** .

- Click the **Load Results** icon, , from the **Standard** toolbar.
The **Load model and results** panel is displayed.

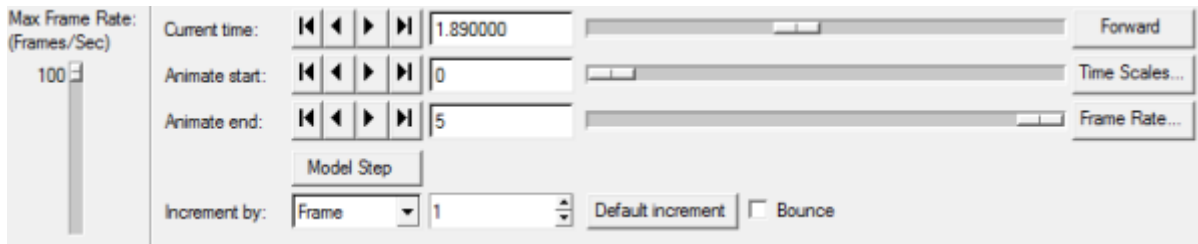


Load model and results panel


- Click the file browser icon, , next to **Load model** and select the model file as `single_pendulum.h3d`, located in your working directory.
- The field for **Load results** will be automatically updated with the same path and name.
- Click **Apply**.
HyperView loads the animation file.
- Click the **XZ Left Plane View** icon  on the **Standard Views** toolbar to change to the left view of the model.
- Click the **Start/Pause Animation** icon, , on the **Animation** toolbar to start the animation.
- Right-click on the **Fit Model/Fit All Frames** icon  on the **Standard Views** toolbar to fit the entire animation in the window.

- Click the **Animation Controls** icon, , on the **Animation** toolbar.

From this panel, you can control the parameters like speed, start time, end time of the animation.




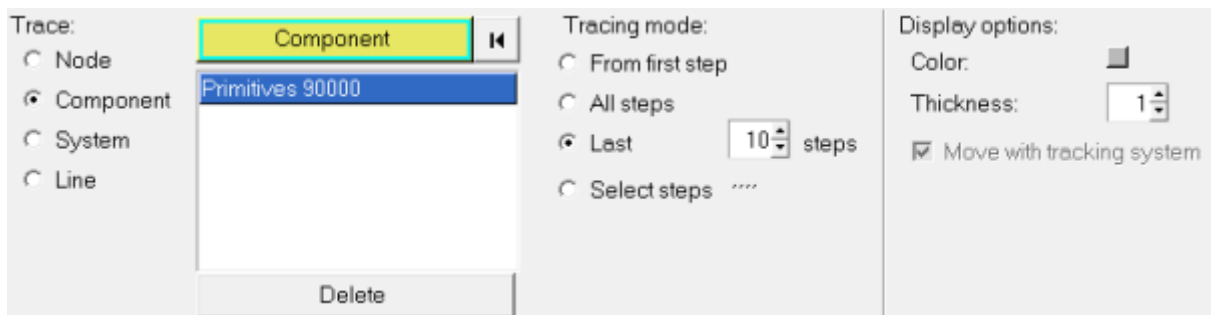
Animation Controls panel

- Drag the vertical slider bar on the left to change the animation speed from fast to slow.
 - **Current time:** show all the time steps.
 - The **Animate start** and **Animate end** sliders can be set to restrict the animation to a certain window in time. For example, moving the start slider to 0 and end slider to 3.5 to restrict the animation to these time limits and covers only a partial cycle of motion.
- Click the **Start/Pause Animation** icon, , on the **Animation** toolbar to stop the animation.


Step 2: Tracing Entities.

HyperView allows you to trace the path of any moving part while animating.

- Retain the animation file `single_pendulum.h3d` that was loaded in **Step 1** above.
- To trace the pendulum motion, click the **Tracing** button, , on the toolbar.





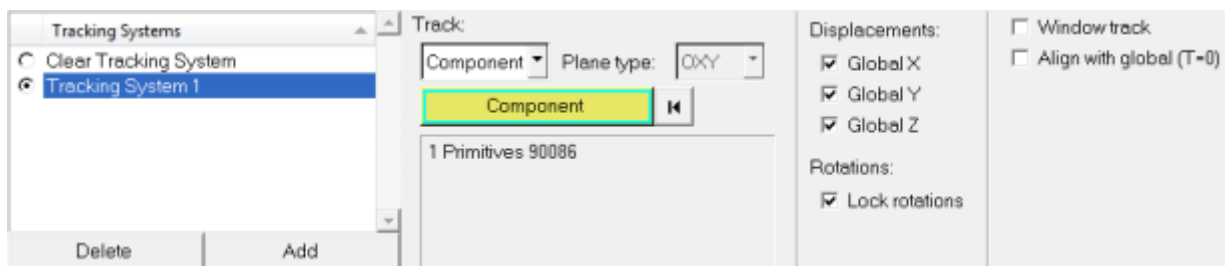
Tracing panel

3. Under **Trace** select **Component** from the radio buttons on the left.
4. Pick the entity/component that needs to be traced by clicking on it from the graphics window.
5. Change the view to the **Iso**  view.
6. Under **Tracing mode:** select **Last** and specify 10 as the **steps**.
7. Animate the model. This displays the last 10 steps in the animation.
8. To turn the tracing off, click the **Delete** button to remove the selected components from the tracing list.
9. Try the **From First Step** and **All Steps** options.
10. Use the **Display Options** to change the line color and thickness.



Step 3: Tracking Entities.

The **Tracking** option allows one of the parts of the animation to be fixed to the center of the animation window and the rest of the parts move relative to the tracked part.

1. Add a new page to the session by clicking on the **Add page** button, , on the **Page Controls** toolbar.
2. Load the animation file `front_ride.h3d` from your working directory.
3. To **Track** or fix any part of your model in the center of the animation window and to see all the other parts moving with respect to the fixed part, click on the **Tracking**, , button on the **Results** toolbar.




Tracking panel

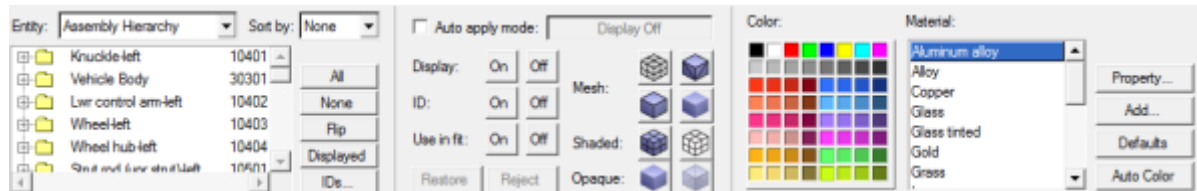
4. Add a tracking system to the animation by clicking on the **Add** button under **Tracking Systems**.
5. Under the **Track** pull down menu select **Component** and click on a part from the model currently loaded.
6. Select the **Displacements** and/or **Rotations** to track the part.
7. Click the **Start/Pause Animation** icon, , on the **Animation** toolbar to start the animation, and click the **Start/Pause Animation** icon again, , to stop the animation.

Step 4: Editing Entity Attributes.




In this exercise, you will edit the graphic entity attributes.

1. Retain the model `front_ride.h3d` loaded in the previous exercise **Step 3** above.
2. Click the **Entity Attributes** icon, , on the **Visualization** toolbar.

The **Entity Attributes** panel is displayed.



Entity Attributes panel

3. Click the arrow to the right of the **Entity** option menu to expand it.
The list contains the following entity types: **Components, Systems, Assembly Hierarchy, and Sets**.
4. Select **Assembly Hierarchy** from this list to show all the parts of the model in the entity list tree below.
5. To change the color of the entire model:
 - Select **Assembly Hierarchy** from the **Entity** option menu.
 - Select **All** from the list of buttons next to the entity list tree (**All, None, Flip, and Displayed**).
 - Select a color from the color palette under the **Color** section.
6. To change the entire model to wire frame:
 - Click **All** from the list of buttons next to the entity list tree.
 - Click the **Wire Frame** icon, , beside **Shaded**.
7. To make the entire model transparent and shaded:
 - Click **All** from the list of buttons next to the entity list tree.
 - Click the **Shaded** icon, .
 - Click the **Transparent** icon, .
8. Use the **On/Off** buttons to turn the entities on or off.
9. Use the **On/Off** buttons next to **ID:** to display and hide the entity IDs.