



Altair

HyperWorks

Altair MotionView 2019 Tutorials

MV-5010: Rigid body Animation - Advanced

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Introduction


In this tutorial, you will learn how to:

- View force and moment vectors from a **MotionSolve** results file.
- Use the collision detection feature
- Use the measure panel to extract information from the animation results

Step 1: Force and Moment Graphics.


HyperView allows you to view the change in force and moment in the form of dynamic vectors that represent the magnitude and direction of the force and moment.

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

1. Start a new **MotionView** session or refresh your **MotionView** session by pressing SHIFT+F9.
2. Change the application on the page to **HyperView**.
3. Load the **MotionSolve** result file `front_ride.h3d` from your working directory.
4. Click on **Vector** icon, , on the toolbar.



Vector panel







5. Under the **Result type:** select **Force (v)**.
6. Click on the **Display** sub-tab and select **By Magnitude** for **Size scaling**.
7. Click on **Apply**.
8. Now, animate the results by clicking on the **Start/Pause Animation** button, .


9. You will see an arrow whose size and direction change dynamically as the simulation is animated from start to end. This arrow represents the magnitude and direction of force on a body or at a joint as it is specified for force output in the model.
10. Click on the **Clear Vector** button to clear the force vector.
11. For the **Result type:** now select **Moment (v)**.
12. Repeat the Steps 6 to 9 to view the Moment vectors of the simulation.
13. Under **Display options:** try changing the scale of the vectors by changing the **Scale value:**.

Collision Detection

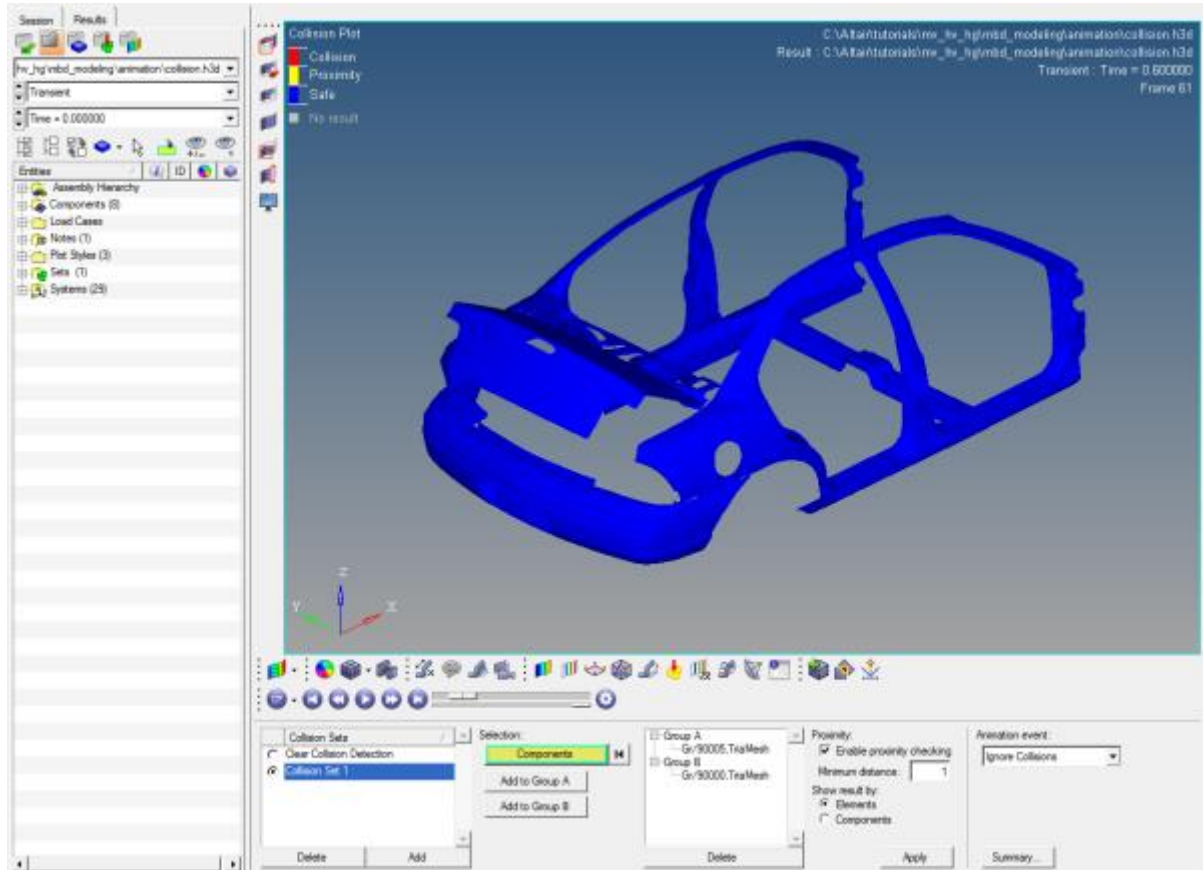
HyperView allows you to view and detect collisions between bodies during simulations.

Step 2: Using the Collision Detection Option.

1. Click the **Add a page** button, , from the toolbar.
2. Use the **Select Application** menu to select **HyperView** as the application.
3. Click the **Load Results** icon,  on the toolbar.
The **Load Model and Results** panel is displayed.
4. Click the **Load model** file browser  and select `collision.h3d`, from your working directory.
5. Click the **Load results** file browser  and select `collision.h3d` from the same location specified in Step 4 above.
6. Click **Apply**.
7. Click the **Start/Pause Animation** icon, , to animate the model.
8. After the file is read, click the **Start/Stop Animation** icon, , to stop the animation.

9. Click the **Collision Detection** button,  on the **Tools** toolbar (if this toolbar is not visible by default, go to the **View** menu and select **Toolbars > HyperView > Tools**).

The **Collision Detection** panel is displayed.




Collision Detection panel

10. Click the **Add** button in the leftmost column under **Collision Sets** to add a new collision set.
11. Pick the **Trunk** body in the graphics area.

Note Clicking on the **Components** input collector will display the **Extended Entity Selection** dialog. The **Extend Entity Selection** dialog provides you with criteria based selection options available for entity selection in HyperView. This method of selection is not used in this tutorial. See the *Selecting Entities Using the Input Collector* topic (located in the *HyperView*) to learn more about using this selection method.

12. Click the **Add to Group A** button.
13. Next, pick the **Car** body in the graphics area.
14. Click the **Add to Group B** button.
15. Under the **Proximity** section, click **Enable Proximity checking** and specify the **Minimum Distance** for the proximity check.


16. Under the **Show result by:** section select **Elements** by clicking on the radio button next to it.
17. Click **Apply**.
18. Click the **Start/Pause Animation** icon, , to start the animation.
The animation begins.
Wherever areas of the trunklid collide with the trunk (car body), the colliding elements turn red.
The color yellow indicates proximity. When neither proximity nor collision is detected, the bodies retain their natural colors.
19. Stop the animation.
20. Try these additional steps:
 - Try to view the **Element** and **Component** results alternately by clicking on the radio buttons in the **Show Results by:** section.
 - Click on **Summary** below to get a text summary of the penetration.

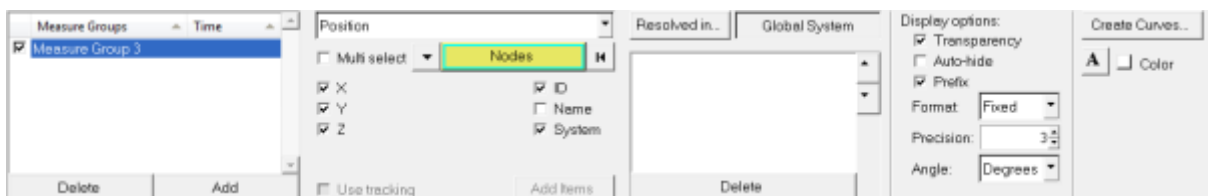
Step 3: Using the Measure Panel.

HyperView allows you to measure certain parameters during post processing of the results.

Refresh your **MotionView** session by pressing SHIFT+F9.

Note Please refer to HyperView tutorial Using Keyboard Shortcuts and Function Keys - HV-2050 for more information regarding keyboard shortcuts.

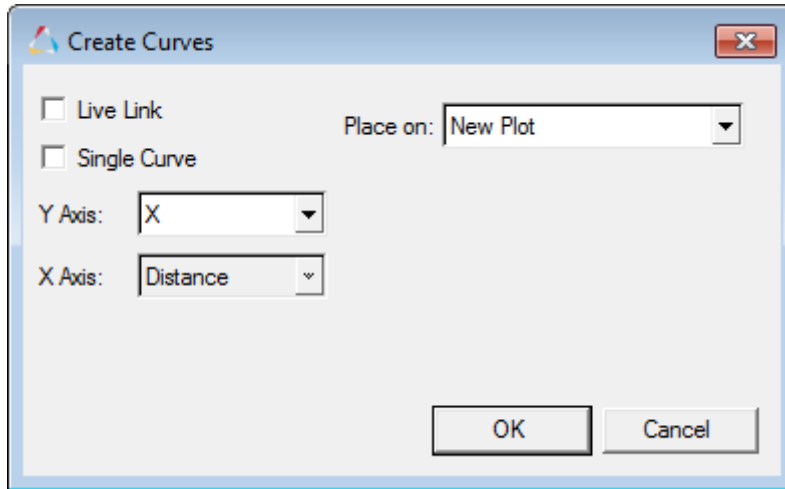
1. Change the Application to **HyperView**.
2. Load the file `front_ride.h3d` as the model and result file from your working directory.
3. Click on the **Measure** button, , on the **Annotations** toolbar to go to the **Measure** panel.
4. Under **Measure Groups** click on **Add** to add a Measure Group.
5. From the measure type pull-down menu select **Position**.




6. Click on the **Nodes** button and from the graphic window pick on a point of your choice.
7. Turn on the check boxes for **X**, **Y** and **Z**.

8. Click the **Create Curves** button (located on the right side of the panel).

The **Create Curves** dialog is displayed.



9. From the **Place on** drop-down menu select **New Plot**.
10. For the **Y Axis:** select **X** and activate the **Live link** check box.

Note The **Live Link** helps you correlate the measured value with the animation. As you animate the current animation model a small square marker moves on the measured curve to indicate the value of the curve at the corresponding time step of the animation.
11. Click **OK**.
12. Repeat Point 10 and 11 twice more by selecting **Y** and **Z** respectively and clicking on **OK** each time.
13. Click the **Start/Pause Animation** icon, , to start the animating the results.
14. You will see a marker on all the three plots which corresponding to the simulation time step in the **HyperView** window.

For more advanced animation options, refer to the HyperView tutorials.