Altair HVVH Tutorials 2019

HVVH-6020: Solution Tab - Verify Altair OptiStruct Results with MAC Comparison

Step 1: Verification-based on Modal Assurance Criterion (MAC) for Altair OptiStruct Solver (NVH).

1. From the *Solution* tab, select the *Solver version result comparison* tab.

2. For **Solver type**, select *OptiStruct*.

3. For **Tolerance**, select the default (1e-06). You can set any tolerance for Scalar, Vector, or Tensor data types.

4. For Result, select H3D.

5. Under **Current**, for **Load Model** and **Load Result**, use the file browser icon to select and open the following file:

   ..\tutorials\hvvh\Solution\ Optistruct\Mac\NMA_1.h3d

6. Under **Reference**, for **Load Model** and **Load Result**, use the file browser icon to select and open the following file:

   ..\tutorials\hvvh\Solution\ Optistruct\Mac\NMA_2.h3d

7. For the *Output directory* field, use the open file icon to select an output directory.

8. Activate the **MAC** check box.

9. Click the *Mac Only* button.

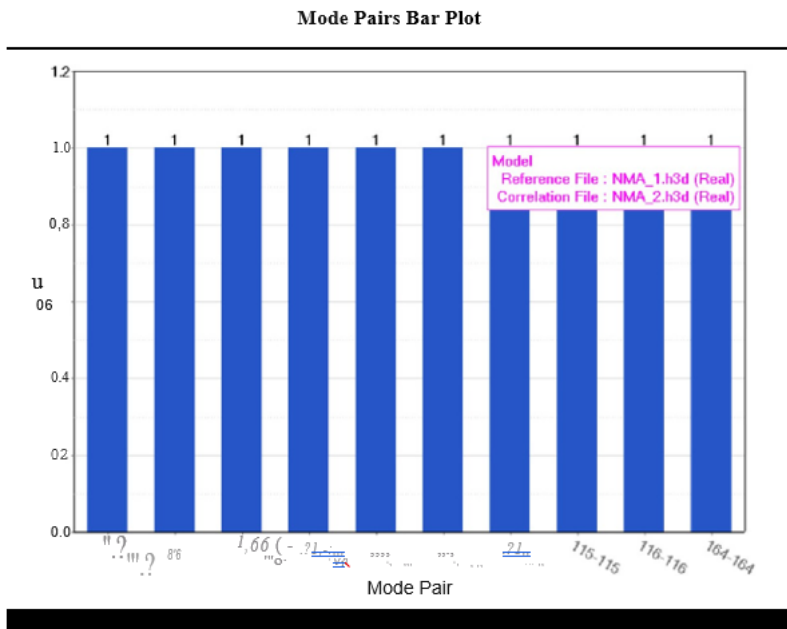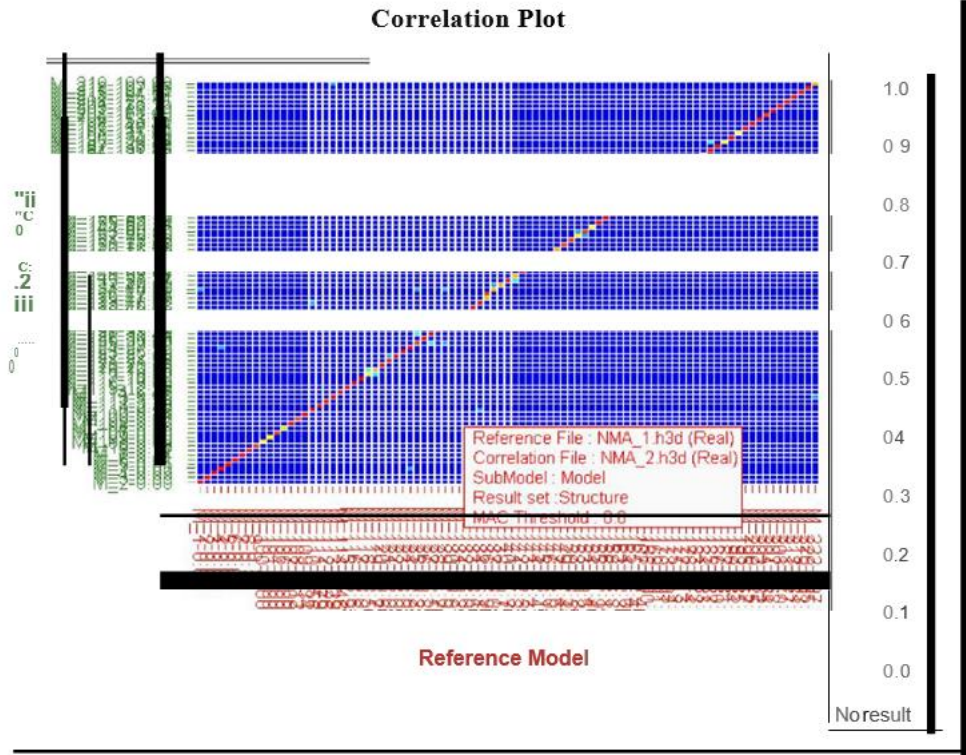   The **mac calculations** start and **Correlation plots** and **Mode pairs bar plot** are generated.

   Note The default config file to get frequency information and the number of MAC values to calculate is available in the current result directory. For example, NMA_1_mac.cfg. This can be changed for different MAC calculations and comparisons.

10. Click *Apply*.

    The results available (subcase, simulation, and result type) in the current result file are loaded in the three windows.
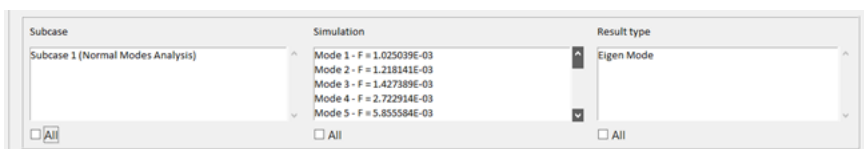
11. Select *All* under each of the windows and click the second *Apply* button.

    Any combination of Subcase, Simulation, and Datatype can be selected for comparison. Results comparison of the current and reference results are generated.

12. In the **Messages** window, the run details are displayed along with the log file location.

13. If any difference is greater than the tolerance, it is indicated with the label **Fail**; otherwise they are labeled **Pass**.

14. Click *HTML Report* to view the HTML report. Comparisons between different data types are available.

15. From the HTML report, click the *MAC report* link to open the Correlation plot and Mode pair bar plot.

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HyperWorks Verification and Validation Harness

Solution - Solver Version Result Comparison Report

Solver Type : OptiStruct   Current Version: 2017.2   Reference Version: 2017.0

Input file : O:MVVH/Input.sfrest_Models/HVVH_J ira/HWH-235/Mac/NMA_1.h3d

!!	Current file	Reference file	Launch HVl

MAC report

MAC Modal Pair Vs MAC Number

MAC Report

1 O./HVVl-Vln puts/Test Models/HVVH_ Jlra/H Subcase 1 (Normal Modes Analysis) Mode 1 - Result type Real	1 O:/HVVl-Vl\ r1>4-1Es/ Test Models/HVVH_J1ra/H Subcase 1 (Normal Modes Analysis) : Mode 1 - .. Res type Real

Correlation Plot

Reference File : NMA_1.h3d (Real)
Correlation File : NMA_2.h3d (Real)
SubModel : Model
Result set :Structure
MAC Threshold : 0.0

Reference Model

1.0
0 9
0.8
0.7
0 6
0.5
04
0.3
0.2
0.1
0.0
No result

Mode Pairs Bar Plot

Model
Reference File : NMA_1.h3d (Real)
Correlation File : NMA_2.h3d (Real)

Mode Pair

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MAC values

Solver Type : **OptiStruct**   Current Version : **2017.2**   Reference Version : **2017.0**

RefMode#	CorMode#	FreqDiff%	MAC
M_1-0.00	M_2-0.00	0.00	0.98
M_2-0.00	M_3-0.00	0.00	0.96
M_3-0.00	M_4-0.00	0.00	0.97
M_4-0.00	M_1-0.00	0.00	0.98
M_5-0.01	M_5-0.01	0.00	0.99
M_6-0.01	M_6-0.01	0.00	1.00
M_7-0.11	M_7-0.11	0.00	0.99
M_8-0.12	M_8-0.12	0.00	0.92
M_9-0.13	M_10-0.13	0.00	0.90
M_100-0.00	M_103-0.00	0.00	0.61
M_101-0.00	M_99-0.00	0.00	0.64
M_104-0.00	M_107-0.00	0.00	0.82
M_106-0.00	M_104-0.00	0.00	0.60
M_107-0.00	M_108-0.00	0.00	0.99
M_108-0.12	M_9-0.12	0.00	0.81
M_109-0.34	M_109-0.34	0.00	0.99
M_110-0.56	M_110-0.56	0.00	1.00
M_111-2.79	M_111-2.78	0.36	1.00
M_112-3.26	M_112-3.26	0.00	1.00

16. Click the first column of the table to open a new graphics window.

Subcase 1 (Normal Modes Analysis), EigenMode
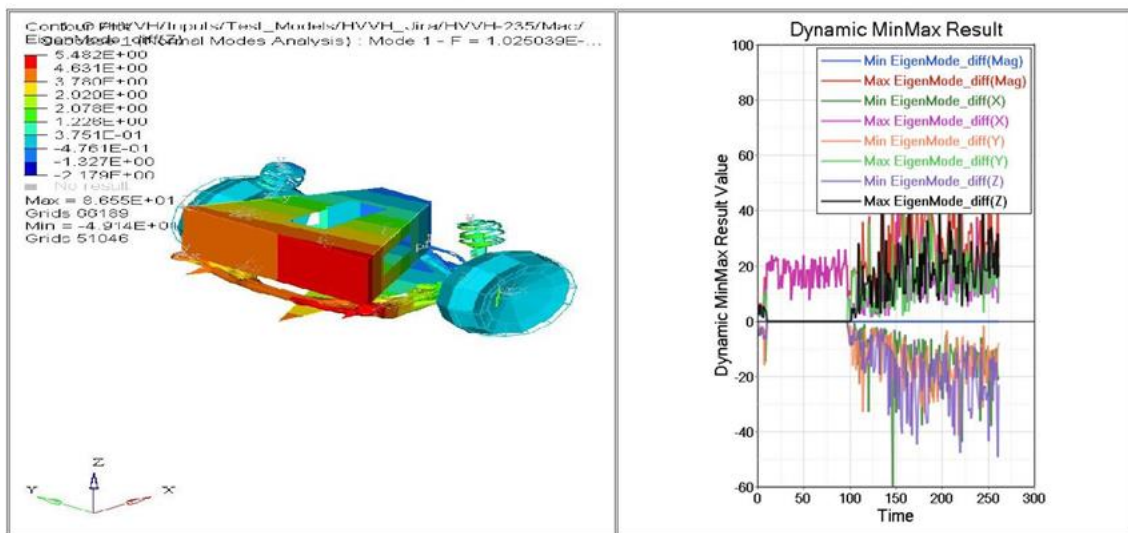
17. In the image above, the left window shows a diff contour (Current-Reference) and the right window shows a diff plot in Altair HyperGraph.

18. In case any difference is greater than the tolerance, it is indicated with the label **Fail**; otherwise they are labeled **Pass**.

19. Click the left window to open the diff-values in H3D in HyperView Player. You can view the difference in the contour and view the area where there is a difference in case of a failure.

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20. Click the right window to maximize/minimize the plot. The difference values for each step are calculated and the min and max values of the difference are plotted.

21. If all the values match and no difference is seen, the curve is a flat line and the diff contours have values less than the tolerance.

22. From the HTML report, click the MAC report hyperlink to open the Correlation plot and Mode pair bar plot.

    This gives information on the model correlation across two results and the modal pairs with different MAC numbers.

    Mode number, frequency, percent frequency difference, and MAC values are listed in the MAC table.