Knowledge Base

Abaqus/CAE Plug-in Utility for Summing Reaction Forces

Portfolio / Domain: SIMULIA Abaqus Unified FEA / n/a
Product: n/a

Information

QA Article: QA(
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QUESTION

I would like to sum the reaction forces for a particular set of nodes in my model. Is there a quick way to do this?

ANSWER

(*The following applies to Versions 6.6 and higher.*)

A plug-in utility is attached for this purpose. For a chosen set of nodes, the utility sums the reaction force components and computes the magnitude of the summed reaction force. The nodes can be picked from the viewport and/or selected from a pre-defined node set. When picking from viewport, nodes must belong to the same instance. This output can be requested as a set of single values for the currently displayed frame (displayed in the Abaqus/CAE Message Area), or as an X-Y curve for the entire analysis. The reaction forces should be present as field output in the output database.

Note that the reaction force components computed by the plug-in are given in the global coordinate system. If a nodal transformation is being used to define a local coordinate system at a node, care must be taken when comparing reaction forces and applied loads.

Note that parts and instances are not supported. The output database (.odb) must be created using flattened input files.

Installation

To install the plug-in, save the attached archive file to one of the following directories:

abaqus_dir\abaqus_plugins where *abaqus_dir* is the Abaqus parent directory

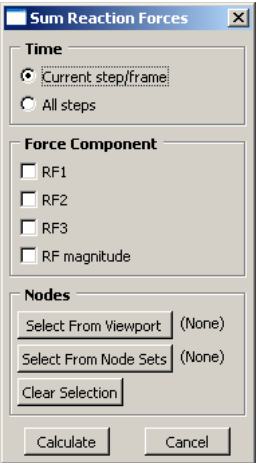*home_dir*\abaqus_plugins where *home_dir* is your home directory

current_dir\abaqus_plugins where *current_dir* is the current directory

Note that if the abaqus_plugins directory does not exist in the desired path, it must be created. The *plugin_dir* directory can also be used, where *plugin_dir* is a directory specified in the abaqus_v6.env file by the environment variable **plugin_central_dir**. You can store plug-ins in a central location that can be accessed by all users at your site if the directory to which **plugin_central_dir** refers is mounted on a file system that all users can access. For example,

plugin_central_dir = r'\\fileServer\sharedDirectory'

On Windows platforms, right click on the archive file and select **WinZip → Extract to here**. On Linux platforms, type **unzip SumReactionForce.zip** at the command prompt. A folder named abq_SumRF and a file named sumRF_plugin.py will be extracted. Note that the plug-in will not function properly if this procedure is not followed

After installation, invoke the plug-in from Abaqus/Viewer by selecting **Plug-ins > Visualization > Sum Reaction Forces...**:

Complete the dialog by selecting:

1.

2.
The time for the calculation; specifically if the summation should be done for the reaction forces available in the current step and frame or if an X-Y plot should be generated for the entire analysis.

2.

3.
The force component

3.

4.
The nodes, either from the viewport or from existing node sets.

Note that when **RF Magnitude** is selected, the plug-in first sums the components for all the nodes, and then computes the magnitude from the summed components. A **Clear Selection** button is provided to clear the selected nodes/node-sets if they should need to be re-specified.

Note that when picking nodes from the viewport, nodes **must** belong to the same instance.

The selected nodes (from the viewport or set) are highlighted after the calculation if a single step is selected.

Revision History

31 May 06	Initial release of SumReactionForce plugin, to be used in Version 6.5 of Abaqus/CAE
27 July 07	Release of Version 1.2-1, to be used in Version 6.6 of Abaqus/CAE
27 July 07	Release of Version 1.3-1, to be used in Version 6.7 of Abaqus/CAE
30 July 08	Release of Version 1.3-2, to be used in Version 6.7 and higher of Abaqus/CAE
13 May 09	Release of Version 1.4-1. Removed limitation of pertubation step usage.
08 Jun 09	Release of Version 1.4-2. Fixed selection of multiple sets and highlight update.
10 Apr 15	Release of Version 1.4-3. Fix to support to plot Reaction Forces for all frames when All steps option is chosen.

Disclaimer

The attachments to this article are subject to certain usage conditions. Please click here for details.

KEYWORDS   plug-in, plugin, python, scripting, customization, gui, kernel, plug in, 3021

ATTACHMENT   Answer_3021_Figure1.png   sumReactionForces.zip

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