

Knowledge Base

Information

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Plug-in utility for high-pass filtering

Portfolio / Domain:SIMULIA Abaqus Unified FEA / SIMULIA Abaqus Unified FEA

Product:n/a

QUESTION

Does Abaqus have a high-pass filtering capability?

ANSWER

Currently Abaqus does not have native high-pass filtering functionality. However, an Abaqus/CAE plug-in for this purpose is attached to this answer. The plug-in contains a fourth order Butterworth high-pass filter that can be used to eliminate the low frequency content of history data. A high-pass filter is the opposite of a low-pass filter, and passes high frequencies but attenuates (or reduces) frequencies lower than the cutoff frequency.

One situation in which a high pass filter may be needed is the appearance of drift in velocity or displacement results. In general, drift may sometimes arise when a slow moving source generates a high frequency signal. As an example, consider the case of an underwater blast wave impinging a floating ship; the motion of the hull will consist of high frequency vibration superposed on a slow, rigid-body type motion. The plug-in can be used in this case to remove any low frequency drift from velocity and displacement history output.

Installation

Native CAE plug-ins are included with the Abaqus/CAE installation. External plugins (those installed after installation of Abaqus/CAE) should not be put inside the Abaqus/CAE installation. To install the plug-in, save the attached archive file to one of the following directories:

```
home_dir\abacus_plugins
current_dir\abacus_plugins
```

where *home_dir* is your home directory and where *current_dir* is the current directory.

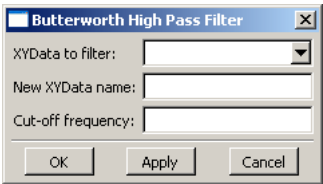
The *plugin_dir* directory can also be used, where *plugin_dir* is a directory specified by the environment variable **plugin_central_dir**. This parameter is used to define a specific directory where plugins are stored. This is typically a central location accessed by all users at your site if the directory is mounted on a file system that all users can access. **plugin_central_dir** can be defined in the abaqus_v6.env file or the Abaqus solver custom_v6.env file. For example,

```
plugin_central_dir = '\\\\fileServer\\share\\AbaqusPlugins'
```

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

Usage

1. Save the history data that you would like to filter.
2. From the Visualization module, select **Plug-ins** → **Tools** → **Butterworth High-Pass Filter...**. The following dialog is displayed:



3. In the **XYData to filter** selection, select the name of history data to be filtered from the pulldown menu. All available history curves will be displayed.
4. In the **New XYData name** selection, specify the name of the filtered curve; it will be available in the **XY Data Manager** after the filtering process is complete.
5. Specify the **Cut-off frequency** and select **Apply**. The filtered and unfiltered curves will be plotted in the viewport.

For more information see:

- [Overview of filtering Abaqus history output](#)
- [Filtering Abaqus/Explicit history output](#)
- [Understanding how aliasing can distort Abaqus results](#)
- [Differences between output filters in Abaqus/Explicit and Abaqus/Viewer](#)
- [Filtering results that are derived from non-linear operators](#)
- [Comparing Butterworth and Chebyshev output filter types](#)
- [How to reduce filter induced end distortions](#)

Revision History

25 Jun 07	Release of Release 1.1-0.
18 Feb 11	Plug-in Release 1.1-1. Fix the Numpy change in 6.10EF.
19 Oct 11	Plug-in Release 1.2-1.

Disclaimer

The attachments to this article are subject to certain usage conditions. Please [click here](#) for details.

KEYWORDS dyna, lsdyna, ls-dyna, undex, drift, integration, filtering, 3407

ATTACHMENT	HighPass_610EF.zip	HighPass_610_Lower.zip	HighPass.zip	Answer_3407_Fig1.png
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