Knowledge Base

Abaqus/CAE plug-in to calculate octave band sound transmission loss

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

QUESTION

How can I calculate octave band sound transmission loss (STL)?

ANSWER

(The following applies to releases 6.9-1 and higher)

An Abaqus/CAE plug-in for this purpose is attached to this answer.

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,

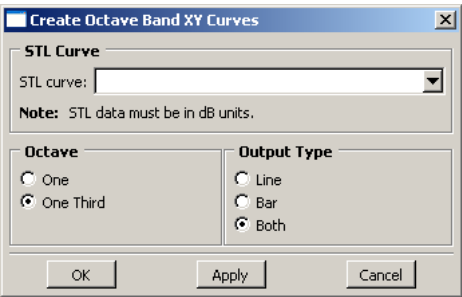plugin_central_dir = r'\\fileServer\sharedDirectory'

On Windows platforms, right click on the archive files and select **WinZip → Extract to here**. On Linux platforms, type **unzip Calculate Octave Band STL Plug-in.zip** at the command prompt. A folder named abq_OctaveBand and a file named octaveBand_plugin.py will be extracted.

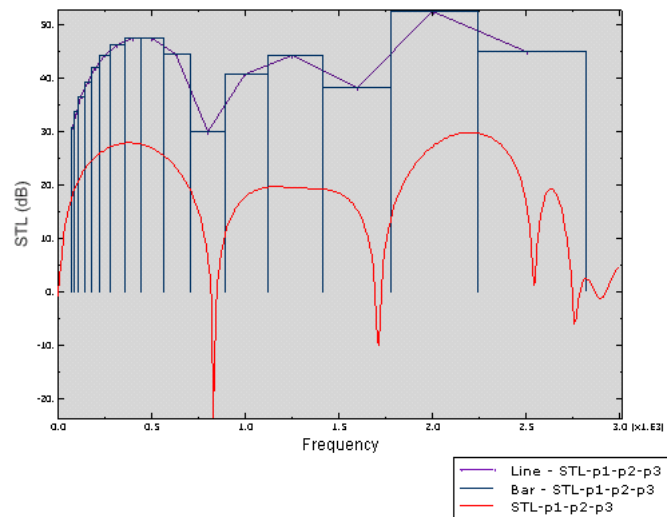Note that the plug-in will not function properly if this procedure is not followed.

Octave Band Plug-in Usage

The plug-in requires continuous STL data that can be obtained using one of the plug-ins attached to Abaqus AnswerCreating sound transmission loss output in acoustics analyses. The Create Octave Band Data plug-in converts the continuous STL data to one-octave band or one-third octave band STL . The output is provided as both line and bar data and is saved as X-Y data.

From the Visualization module, the plug-in can be accessed as **Plug-ins → NVH → Acoustics Toolset → Octave Band...** to receive the following dialog:
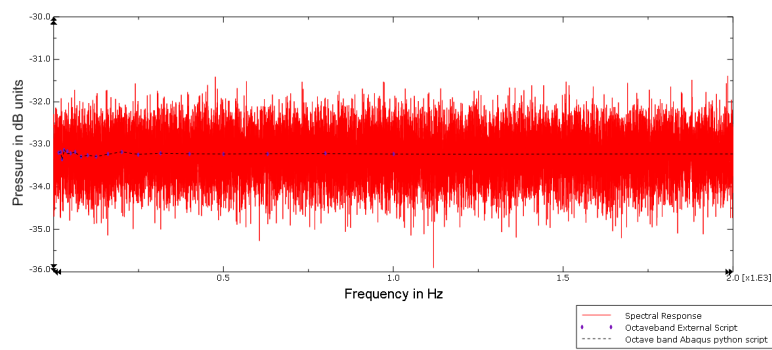

Using the selections shown in the dialog box above, a plot is generated as shown below:

In order to validate the script, the power spectrum of white noise data was used as the input (white noise has equal power in a fixed band-width at any center frequency. Therefore, the octave band response in any frequency bin should

be more or less constant.). The resulting octave-band data was compared with that generated by an analytical expression based on Reference 1. As shown in Figure 3, the curves agree very well with each other.

References

1. VA One 2008: Foam Module, User's Guide, Theory and QA

Revision History

| 22 Feb 10 | Release version 1.1-1 |
| 15 Aug 11 | Correction to method of importing Python Numeric module |

Disclaimer

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

| KEYWORDS | plug-in, plugin, acoustics, octave, band, STL, thirdband, third-band, 3rd, 4263 |

| ATTACHMENT | answer_4263_fig2.png   Calculate_octaveBand_STL_plugin.zip   answer_4263_fig1.png   answer_4263_fig3.png |

| SUBSCRIBE TO CHANGES | ☐ |

| RATING | On a scale of 1-5, how would you rate the technical content of the article? Please rate this article... |

| LET US KNOW IF THIS ARTICLE NEEDS TO BE ENHANCED | UNCLEAR   MISSING INFO   DUPLICATE   OUT OF DATE   ERROR DETECTED |

MY FAVORITE CONTENT