

# SEISMOGRAPH

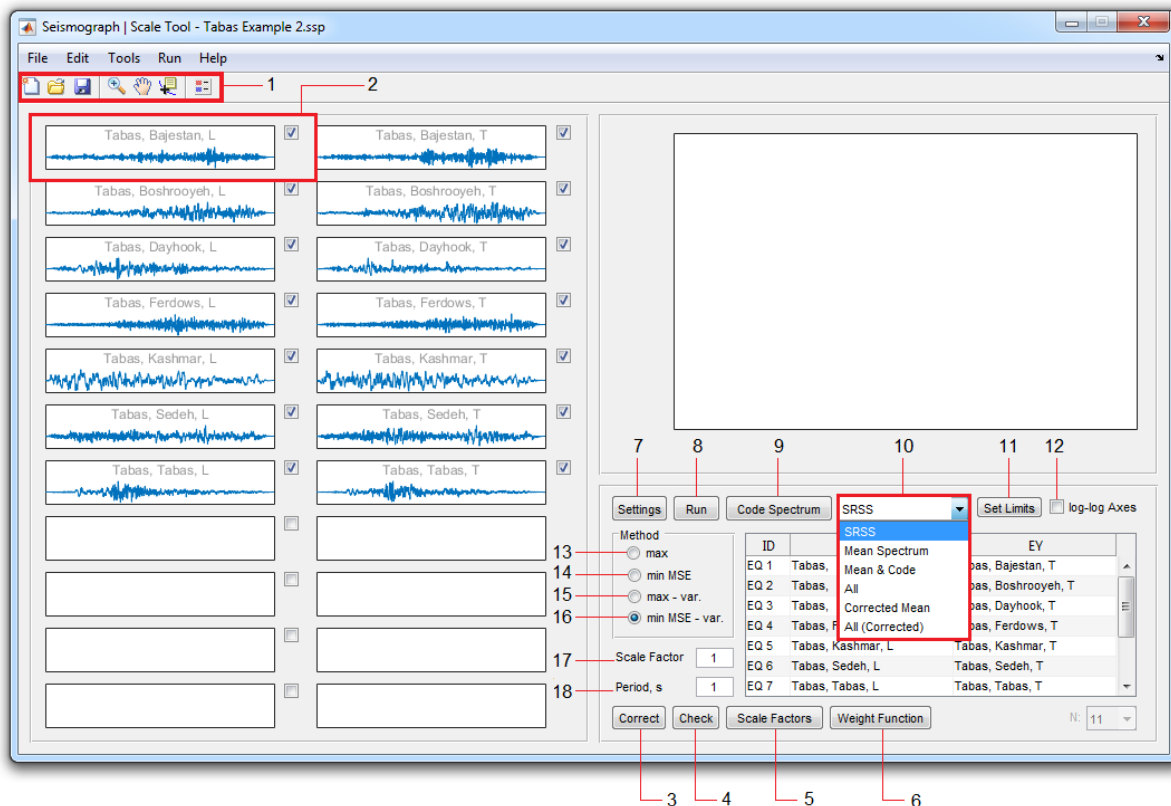
Quick Start Guide (A)

**SCALE Tool** (v5.2)

## Table of Contents


<b>1. Main Window</b> .....	<b>2</b>
<b>2. Menu Bar</b> .....	<b>6</b>
<b>3. Adjust Tool</b> .....	<b>8</b>
<b>4. Tables</b> .....	<b>9</b>
<b>5. Spectrum Settings</b> .....	<b>10</b>
<b>6. Set Minimum Level</b> .....	<b>11</b>
<b>7. MCR Settings</b> .....	<b>12</b>

## 1. Main Window



### 1. Main Toolbar, including the following tools:

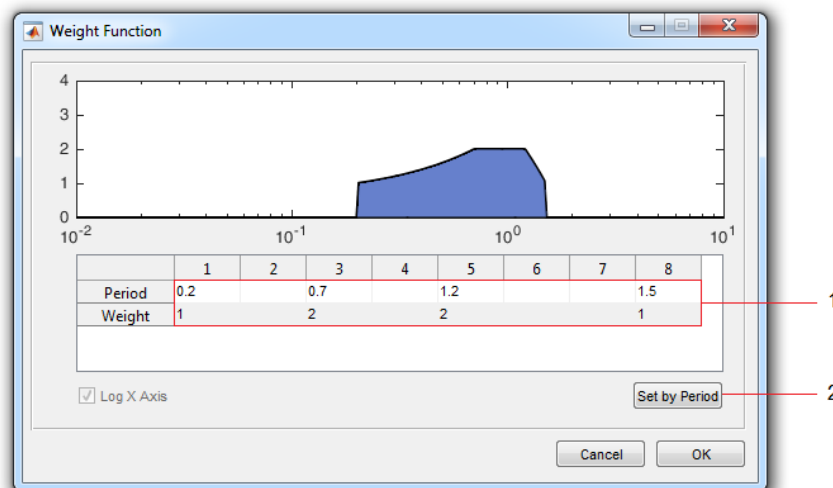
1. **New**: to create a new project
2. **Load**: to load a project from file (\*.ssp)
3. **Save**: to save current project as a new file (\*.ssp)
4. **Zoom tool**
5. **Pan tool**
6. **Datacursormode** (enables selecting a point on the plot and opens a data tip displaying its coordinates)
7. **2D/3D Switch**. In **3D** (default) mode, records are considered as 11 pairs of ground motions and the scale factors are assigned to each pair. In **2D** mode, 22 records are considered independently.



	ID	EX	EY
1	EQ 1	Tabas, Bajest...	Tabas, Bajest...
2	EQ 2	Tabas, Boshro...	Tabas, Boshro...
3	EQ 3	Tabas, Dayho...	Tabas, Dayho...
4	EQ 4	Tabas, Ferdo...	Tabas, Ferdo...
5	EQ 5	Tabas, Kashm...	Tabas, Kashm...
6	EQ 6	Tabas, Sedeh, L	Tabas, Sedeh, T
7	EQ 7	Tabas, Tabas, L	Tabas, Tabas, T

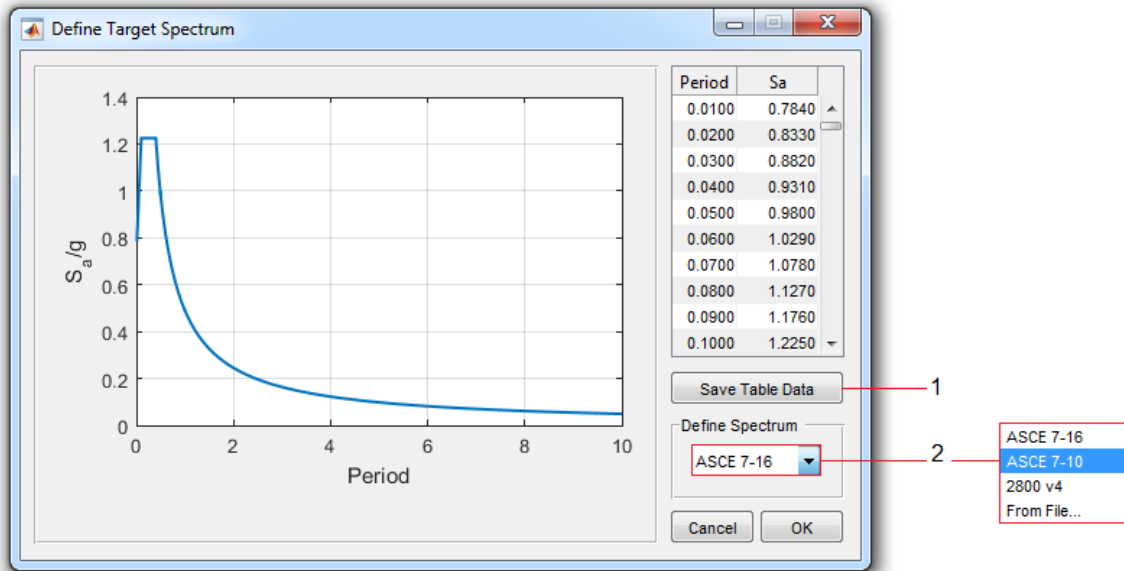
	ID	EX
1	EQ 1	Tabas, Bajestan, L
2	EQ 2	Tabas, Bajestan, T
3	EQ 3	Tabas, Boshrooyeh, L
4	EQ 4	Tabas, Boshrooyeh, T
5	EQ 5	Tabas, Dayhook, L
6	EQ 6	Tabas, Dayhook, T
7	EQ 7	Tabas, Ferdows, L
8	EQ 8	Tabas, Ferdows, T

2. Input Record panel. To load acceleration time-history from a file into each panel, simply enable its checkbox. Use the first checkbox to load all records simultaneously. To delete any record, just uncheck the corresponding checkbox. (**Note:** You may need to recalculate the response spectrums after adding new records)
3. Use this button to calculate scale factors using the selected method (from options **13** to **16**). After performing the correction, both original and corrected spectrums data are copied into the clipboard. (**Auto Copy** feature)
4. Use this button to recalculate the mean spectrum using the calculated scale factors. The result is displayed in a new figure.
5. Use this button to display the calculated scale factors. Data are displayed in a table and will be automatically copied into the clipboard. (**Auto Copy** feature)
6. Use this button to define the weight function, required for the Min MSE method:



1. Enter the period value and its weight in the table.
2. Use this button to set a uniform weight throughout the entire scaling period range. (Default: 0.2T to 1.5T)

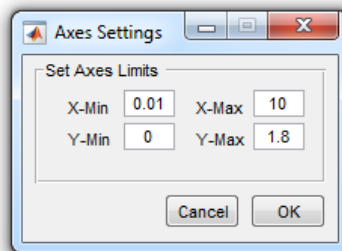
7. Access to the program's main settings.
8. Calculate the response spectrums.
9. Use this button to define Target Code Spectrum.



1. Use this button to save table data into a \*.txt file.
2. Use this menu to select the available code spectrums.

10. Depending on the selected option, the SRSS, RotD or GeoMean spectrums (3D Mode), or the individual spectrum (2D mode), uncorrected mean spectrum, Code spectrum, and the corrected mean spectrum can be displayed.

11. Specify the limits for the current axes.



12. Enable this checkbox to use a logarithmic scale for the current axes.

13. Direct Method (using one scale factor). By preserving the shape of the mean spectrum, shifts it so that the difference between the corrected spectrum and the Code spectrum within the scaling period range (default: 0.2T to 1.5T) is in accordance with the scale factor of option **17**.
14. Min MSE Method (using one scale factor). By preserving the shape of the mean spectrum, shifts it to minimize the MSE value. (You should have defined the weight function)
15. Direct Method (using different scale factors): Similar to Option **13** except that the shape of the mean spectrum will change.
16. Min MSE Method (using different scale factor): Similar to Option **14** except that the shape of the spectrum will change. (You should have defined the weight function)
17. This scale factor describes the difference between the corrected spectrum and the Code spectrum only for the direct correction method (It should not be mistaken with the *calculated scale factors* which are computed after applying the correction). If this scale factor is equal to 1, the corrected spectrum doesn't fall below the code spectrum at any point of the scaling period range. If you need the mean spectrum to fall - no more than 10% - below the 1.3 times the code spectrum, this scale factor should be 1.17.

**Note:** this option will be removed in the future release.

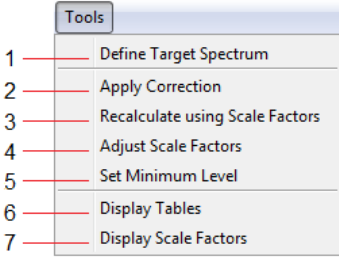
18. Enter the fundamental period of the structure to determine the scaling period range. (default: 0.2T to 1.5T)

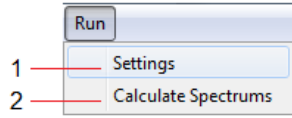
**Note:** If the Min MSE method is used, you will need to modify the weight function once the period of the structure (or default scaling period range) is changed.

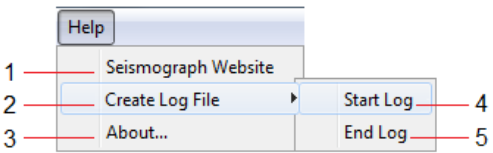
## 2. Menu Bar

File	
<ol style="list-style-type: none"> <li>1. Create a new project</li> <li>2. Load a project file (*.ssp)</li> <li>3. Save current project as a new file (*.ssp)</li> <li>4. Export outputs</li> <li>5. Exit the program</li> </ol>	
Export	
<ol style="list-style-type: none"> <li>6. Mean Spectrum (*.txt)</li> <li>7. Corrected Mean Spectrum (*.txt)</li> <li>8. Corrected Records (*.txt / *.sed)</li> <li>9. Original Records (*.txt / *.sed)</li> <li>10. Export all available data to Excel, including:                             <ul style="list-style-type: none"> <li>• Uncorrected acceleration time histories + scale factors</li> <li>• Code spectrum</li> <li>• Original and corrected mean spectrums</li> <li>• Original response spectrum for all records</li> </ul> </li> </ol>	

Edit	
<ol style="list-style-type: none"> <li>1. Copy current axes to a new figure</li> <li>2. Access to MATLAB Runtime settings</li> </ol>	

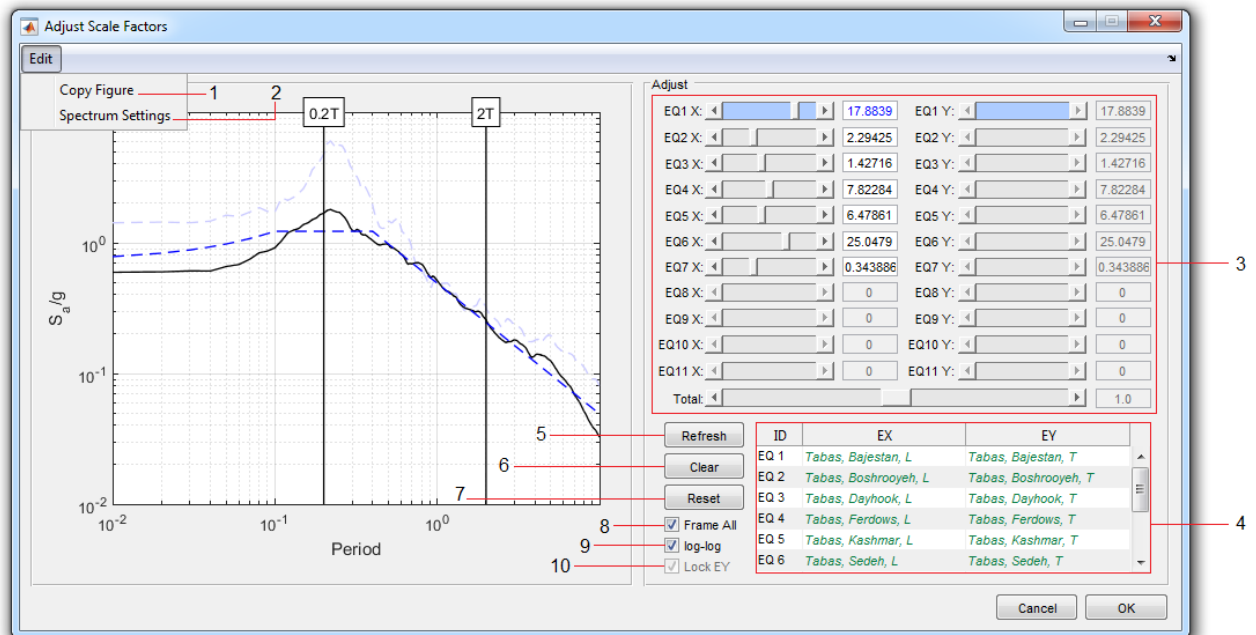
Tools	
	<ol style="list-style-type: none"> <li>1. Define the target spectrum</li> <li>2. Apply the Correction (using the selected method)</li> <li>3. Recalculate the mean spectrum using the computed scale factors</li> <li>4. Manually adjust scale factors using the <b>Adjust Tool</b></li> <li>5. Correct the minimum level of the mean spectrum</li> <li>6. Display all calculated data in table format</li> <li>7. Display calculated scale factors</li> </ol>

Run	
<ol style="list-style-type: none"> <li>1. Access to the program’s main settings</li> <li>2. Calculate response spectrums for all records</li> </ol>	

Help	
<ol style="list-style-type: none"> <li>1. Visit the product page on the SEISMOGRAPH website</li> <li>2. Create a Log file for bug report</li> <li>3. View description of the current version of the software</li> </ol>	
Create Log file	
<ol style="list-style-type: none"> <li>1. Start writing the Log file</li> <li>2. Stop writing the Log file (it is saved the in the software’s installation folder.</li> </ol>	



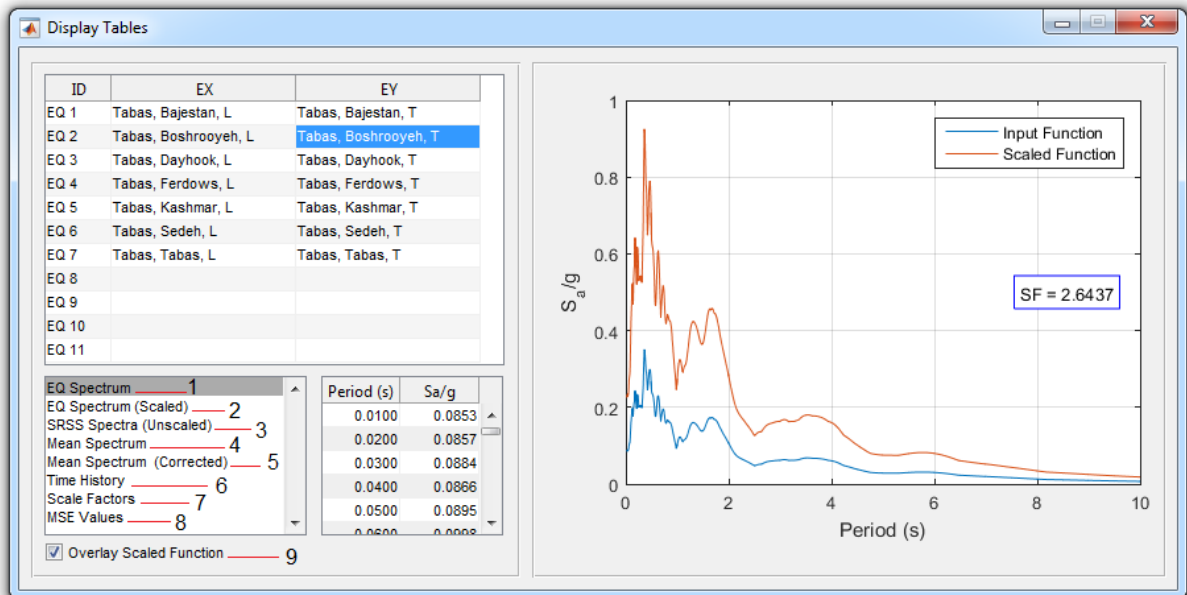
### 3. Adjust Tool



1. Copy current axes to a new figure.
2. Access to the spectrum calculation settings. (disabled)
3. Use these sliders to change the scale factor for each record. You can also enter the scale factor directly into the textbox. Use the Total slider to change all scale factors simultaneously.
4. Select each record from this table to display its response spectrum (in gray dashed line). Also the corresponding slider and the scale factor (in option **3**) will be highlighted with a distinct color.
5. Use this button to refresh the plot.
6. Use this button to clear current selection.
7. Reset all scale factors to initial values.
8. Enable this checkbox to use logarithmic scale for the y-axis.
9. Use this checkbox to change the limits of the period axis from the scaling period range (default: 0.2T - 1.5T) to full range.
10. To lock the scale factors for Y component of each pair of ground motion. (disabled)

**Note:** It is not allowed to assign different scale factors to the Ex and Ey components of the ground motion in 3D Mode.

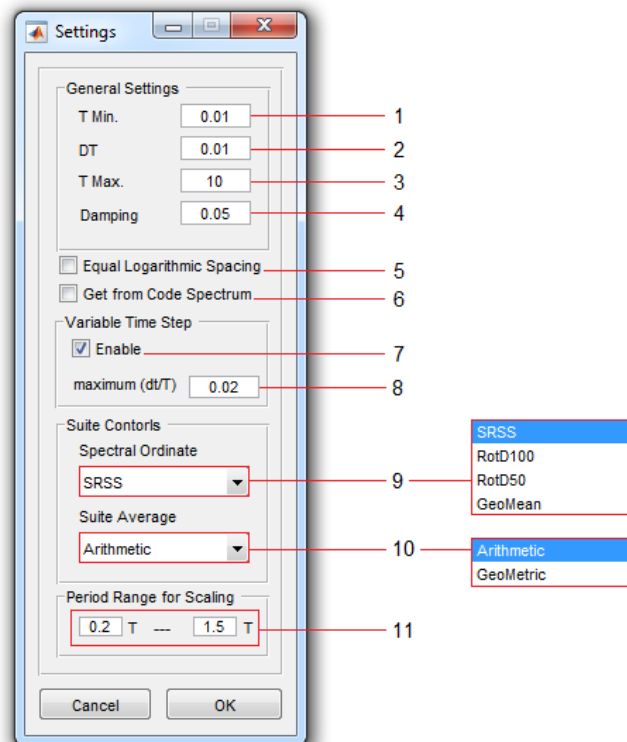
## 4. Tables



1. Display the response spectrum for the selected record from the table (if checkbox **9** is enabled, scaled response spectrum and the scale factor are also displayed)
2. Display the corrected response spectrum for the selected record.
3. Display the Spectral Ordinate. (SRSS, GeoMean or RotD) for each pairs (in 3D mode)
4. Display the mean spectrum. (and the corrected mean spectrum, if checkbox **9** is enabled)
5. Display the corrected mean spectrum.
6. Display the time history of selected record. (if checkbox **9** is enabled, scaled time history and the scale factor are also displayed)
7. Display scale factors.
8. Display MSE values (for Min MSE method only)
9. Use this checkbox to add the scaled response spectrum (or the corrected mean spectrum) to the current uncorrected plot.

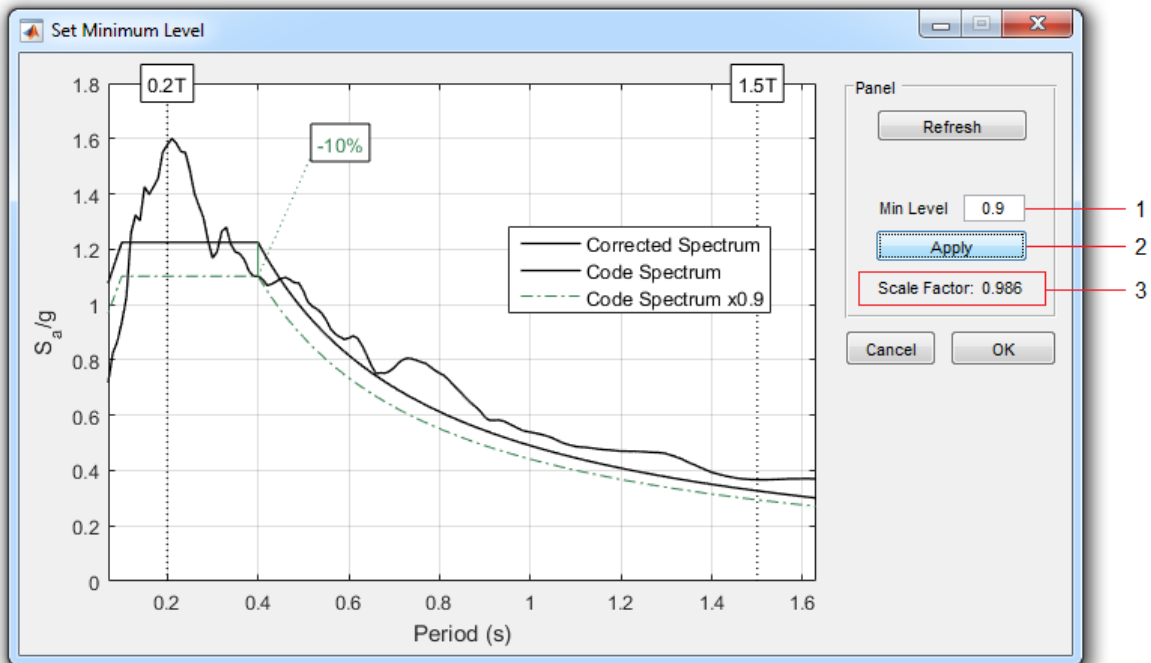
Note: all data displayed in the table will be automatically copied into the clipboard. (**Auto Copy** feature)

## 5. Settings



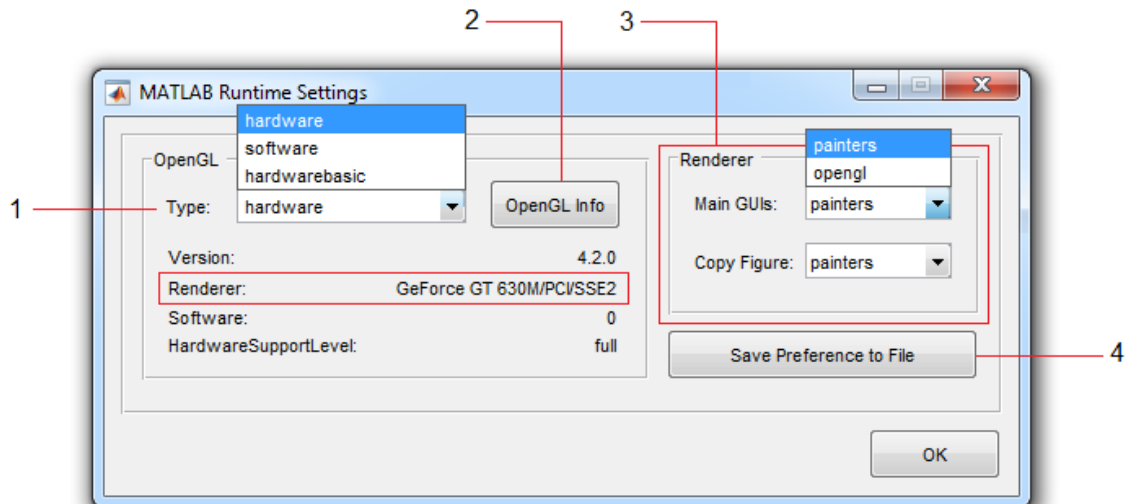
1. Minimum Period.
2. Period increment / or number of points at which the response spectrum values are calculated.
3. Maximum Period.
4. Damping ratio.
5. Enable this checkbox to use equal logarithmic spacing to determine the periods at which the response spectrum values are calculated. If enabled, text box **2** turns into the number of points (Np).
6. Enable this checkbox to use the code spectrum's periods to calculate the response spectrums.
7. Enable the use of variable time step. Can be used to calculate the spectral values more accurately in the near-zero periods. (more time required)
8. Maximum value for the ratio of record Time Step to Period. (dt/T)
9. Select the spectral ordinates from this menu. (SRSS/RotD100/RotD50/GeoMean)
10. Select the averaging method. (Arithmetic/Geometric)
11. Define the period range for scaling ground motions.

## 6. Set Minimum Level



1. Specify the minimum value for the ratio of the corrected spectrum to the target spectrum. (e.g. 0.9)
2. Use this button to apply the Specified minimum value.
3. The calculated scale factor is displayed in this section. (It is applied to all records to correct the minimum value.)

## 7. MCR Settings



1. Select OpenGL Type. By default, hardware is used. If the graphics card driver is not updated there will be some graphic issues. In this case, switch to software OpenGL for the current session.
2. Display information about the OpenGL® implementation currently in use by the software, such as the version, renderer, and other features. If you don't see your graphics card in the renderer field, you will need to change the preferred graphics processor for the software. (See: [MCR Settings](#) for more information)
3. Select Default renderer for: Main software's GUIs as well as the Copied Figures.
4. Save current settings to an output file (which will be used next time when the software launches)

**Note:** if there is graphics card driver issue, you can lunch program with the software version of OpenGL. You just need to download the preferences file (pref.xml) from the website and place it into the installation folder.

**SEISMOGRAPH**

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