Datasheet: Pwrspectrum_pkdetect.s2s

Summary

This script identifies peaks in a power spectrum stored in a Spike2 result view.

The highest peak and up to 9 other peaks are marked with cursors and a table of up to 50 peak frequency and power values is written to the log view.

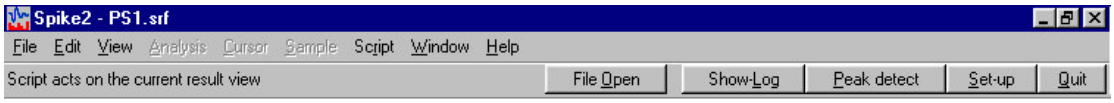
Software requirements: This script requires Spike 2 version 4 or higher.

Operating principles:

In Spike2 version 4, it isn't possible to search for peaks in a result view, such as a power spectrum, using active cursors. In order to overcome this difficulty, this script makes a copy of the spectrum in a hidden time view by converting the frequency axis to a time axis. Active cursors are used in this dummy time view to detect peaks meeting the required criteria.

User Guide.

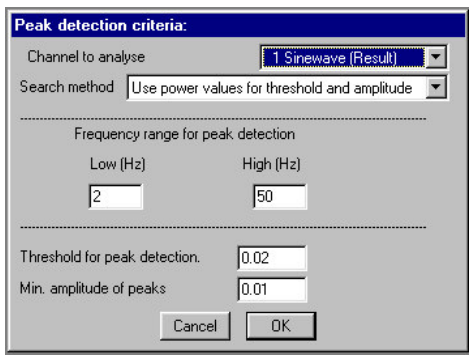
When you run the script, unnecessary desktop items such as the Status bar are hidden in order to maximize the screen area available for displaying data. The screen is restored to its former state when you quit the script. The script has a toolbar with 5 buttons, File Open, Show-Log, Peaks, Set-Up and Quit. Each button has a hotkey, shown underlined.



The Quit button is always active and does what you would expect. Other buttons are enabled and disabled at various points during script operation to ensure that you press them in a logical sequence.

The script operates on the result view that is at the front, i.e. the window with the highlighted title bar. If several power spectrum windows are open, click on one with the mouse to select it. Alternatively, click on File Open to open a file from disk.

The next step is to click on Set-up. A dialog opens for you to enter the peak detection criteria. First, select the channel to analyze and then choose a search method from the drop-down list. The default method is to define the threshold and minimum amplitude values as power values. The alternative is to set them as a proportion of the highest peak in the chosen frequency range. The low and high frequency limits for the search default to the entire range of the current power spectrum when the script is first run. On subsequent passes, the values are those used on the previous run.



The threshold for peak detection and Minimum amplitude of peak selection boxes are blank initially. The values required depend on the search method.

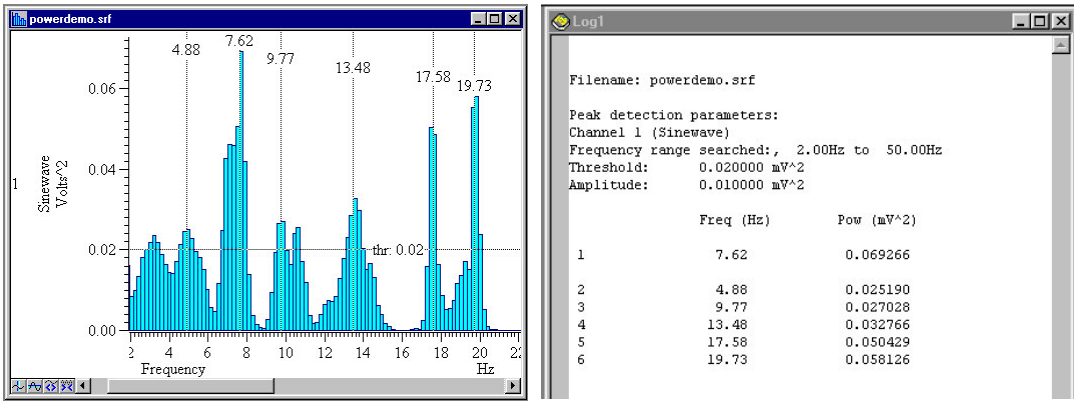
If you are using power values, then you enter the threshold and minimum amplitude values in Y-axis units. All peaks that do not reach the threshold level will be ignored. The minimum amplitude sets the threshold height of a peak relative to the immediately preceding and following troughs in order for that peak to be counted. The purpose of the amplitude criterion is to exclude small fluctuations between larger peaks. If you want to detect all peaks no matter how small, you should set very low values for both threshold and amplitude.

If you are searching for peaks relative to the highest peak, enter percentage values in the threshold and minimum amplitude boxes. Press OK when ready.

There will be an error message if the contents of the dialog are incomplete or invalid. Otherwise, click on Peak detect to find the peaks meeting your criteria. The highest peak and up to 9 subsidiary peaks are then marked with cursors in the power spectrum and a horizontal cursor marks the threshold level used. The cursor positions are stored automatically when the power spectrum is closed, without the need to re-save the file. Pre-existing cursors are deleted.

The power and frequency values of up to 50 peaks in the range are also tabulated in the log view with the highest peak listed first, followed by the other peaks in ascending order of frequency, not amplitude. You can display or hide the log using the Show-Log and Hide-Log toolbar buttons.

Typical results of applying the script are shown below. Note that the initial peak at around 3Hz is above threshold but is not detected because the 'amplitude' (in this case the size of the subsequent trough) is below the required value of 0.01.



To apply the same peak detection parameters to other power spectra, simply click on the next spectrum or open a new one using the File-Open and then click on Peak detect again. You search parameters.

You can transfer the results in the log file to a text file or a spreadsheet by copying and pasting. You must do this before running the script again because the previous contents of the log are cleared when the script runs.