

**NAME**

spfrqramps – calculate spike frequency and current min/max for current ramps

**SYNOPSIS**

**spfrqramps** [-n num] [-c wfnum] [-ct thresh] [-cd delay] [-s wfnum] [-t thresh] [-h hyst] [-d] [-r start,end] [-a] runfile

**DESCRIPTION**

*Spfrqramps* first looks at the injected current waveform, to determine the range of samples to be analysed. It then backs off the end point (when current is turned off) by 0.2 ms, to avoid spikes that are artifacts of the current being switched off. It then analyses the spike frequencies and current levels up and down the current ramp.

Output will be in this form:

"Filename", RampNo, Nspikes, MinIup, MinIdown, MaxI, MinFQup, MinFQdown, MaxFQ

where the spike frequencies (FQ) are in Hz, and the current (I) is in the units for which that waveform was calibrated.

It runs the *analysis*(1) program on a copy of each specified *runfile*, so the changes it makes during analysis (copying or differentiating waveforms, setting waveform parameters) will not alter any of your run files or their parameters.

**Options****-n num**

Specifies the number of samples of the current waveform that will be averaged, centered at each spike start time, to obtain the corresponding current level (default is 1).

**-c wfnum**

Specifies the waveform number for the injected current waveform (default is 0).

**-ct thresh**

Specifies the current threshold for burst detection. The default action is automatic detection using the mean current level, or the cycle threshold previously set in the waveform parameters for this current waveform.

**-cd delay**

Specifies the minimum crossing delay for burst detection, in ms. The ideal is about half of the expected current burst duration. The default value is 800.

**-s wfnum**

Specifies the waveform number for the waveform containing the spikes to be measured (default is 1).

**-t thresh**

Specifies the spike threshold to be used for the waveform above, given as a differential (default is 500). If the **-d** option is used, then the spike threshold is given in whatever units the analysis program uses for displaying this waveform, but the default is still the same.

**-h hyst**

Specifies the spike triggering hysteresis to be used for the waveform above, given as a second differential, i.e. relative to the threshold. The default is 0, for no hysteresis.

**-d**

Specifies that spike triggering will not be on a differential waveform, and threshold above will be an actual waveform level. By default, the spike waveform is differentiated to allow triggering on a waveform with a lot of baseline shift.

**-r start,end**

Specifies the start and end time in the *runfile*, in milliseconds or whatever is selected as the current time units in the runfile's analysis parameters. This overrides the range determined by detecting a current burst in the injected current waveform.

**-r mult**

Specifies that multiple bursts of current will be looked at on the injected current waveform, and each burst will be processed and reported.

**-r start,end,mult**

Specifies the start and end of the analysis range, and specifies that multiple bursts in that range will be analysed.

**-a** Specifies that an ASCII text file of the times and frequencies should be generated for each run file, as comma-separated values (a **.csv** file). The times (X values) are first on each line, followed by frequencies (Y values).

**--help**

Causes the program to output a summary of command usage and options.

**EXAMPLES****spfrqramps -s 2 -c 1 FF1740521**

Simple case using mostly defaults. The FF1740521 in the command line is the runfile analysed, and the spike and current waveform numbers are given explicitly as 2 and 1 respectively.

**spfrqramps -r mult -c 1 -s 0 -d -t -32.9089 -n 25 050909-031**

Multiple current ramps are analysed in the run file 050909-031, with differentiation turned off, and the spike threshold is set at -32.9089 mV. The current at each spike is calculated from an average of 25 samples.

**spfrqramps -n 5 -c 1 -ct -2.75 -cd 4200 -s 0 -t -5 -h 1 -r mult -a 091103-014**

All current ramps in run file 091103-014 are analysed, with almost all options specified explicitly. The differential spike threshold is -5, with a positive hysteresis of 1, so it will trigger on negative-going spikes.

**SEE ALSO**

analysis(1), avgspfrq(1), spfrqpeel(1)