DADiSP / SRS

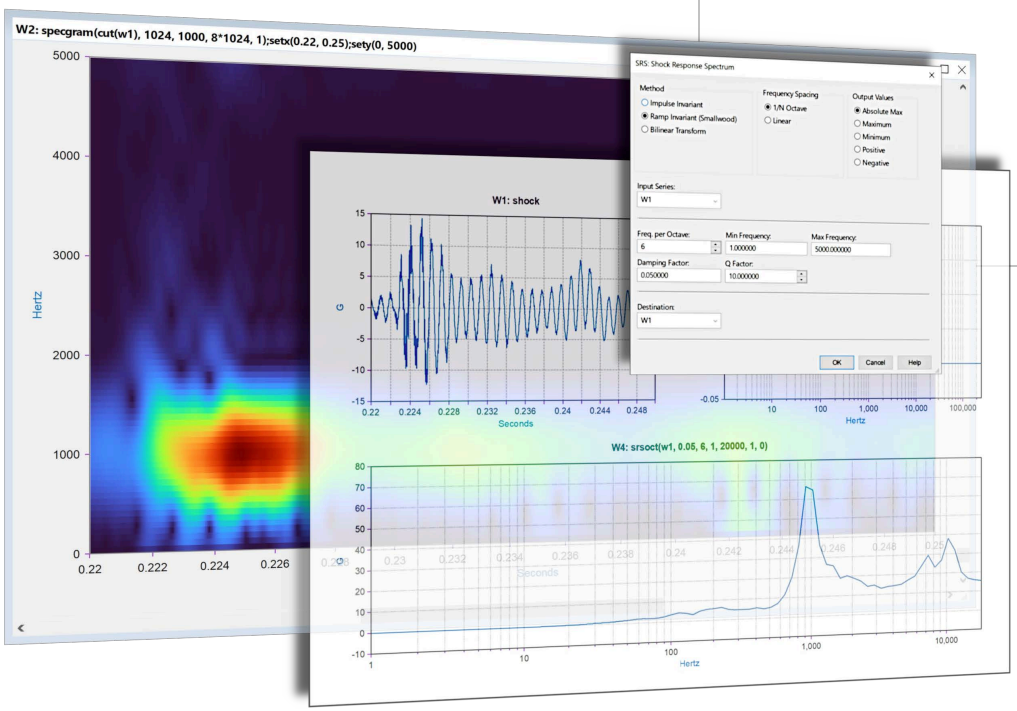
Shock Response Spectrum Module

DADiSP/SRS is a menu driven module designed for the analysis of the Shock Response Spectrum (SRS). SRS Analysis is a useful tool in minimizing the potential damage to a component due to shock. SRS is employed in industries such as aerospace engineering, automotive engineering, Department of Defense and ordnance evaluation.

Given acceleration time history data, the SRS module allows the user to choose from a variety of industry standard analysis methods and select the desired frequency range and spacing. The damping ratio or Q factor is also adjustible.

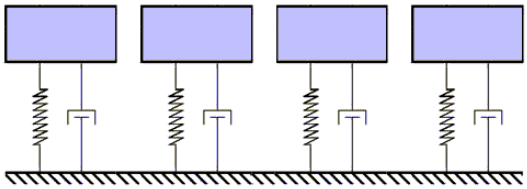
KEY FEATURES

- Ramp Invariant (Smallwood) Step Response Matching Algorithm
- Impulse Invariant Impulse Response Matching Algorithm
- Bilinear Transform Frequency Response Matching Algorithm
- Whole Octave Frequency Spacing
- Fractional (1/N) Octave Frequency Spacing
- Linear Frequency Spacing
- Adjustible Damping Ratio / Q Factor



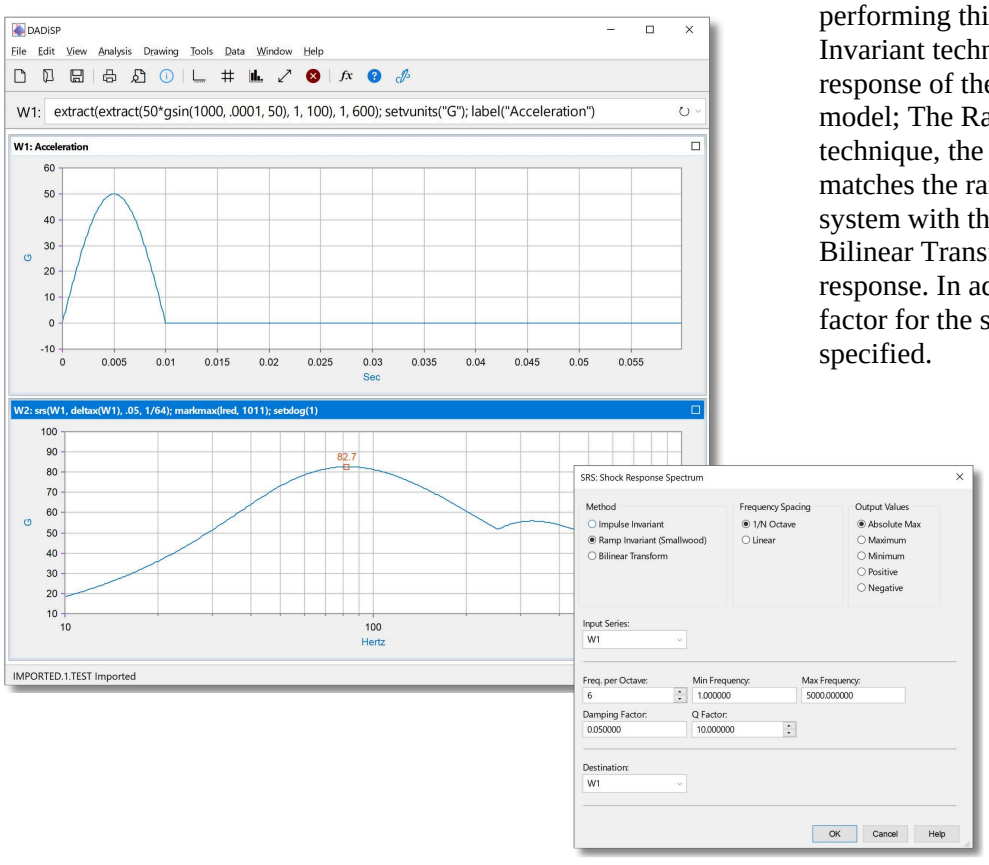
Shock Response Spectrum Module

The Shock Response Spectrum, or SRS, is used in modeling a mechanical component as a series of single degree of freedom (SDOF) spring-dashpot subsystems each with a constant damping ratio and varying natural frequency. Each spring-dashpot subsystem is considered a 2nd order linear system and is converted into the digital domain. The absolute maximum response of each spring-dashpot subsystem is returned as the SRS result for the corresponding natural frequency of the subsystem. A plot of the absolute maximum responses for all the natural frequencies is the Shock Response Spectrum.



Multiple Analysis Methods

To calculate the SRS, each analog 2nd order spring-dashpot subsystem is converted into the digital domain. DADiSP/SRS supports three industry standard methods of performing this transformation: the Impulse Invariant technique matches the impulse response of the analog system with the digital model; The Ramp Invariant (Smallwood) technique, the most common approach, matches the ramp response of the analog system with the digital model; and the Bilinear Transform matches the frequency response. In addition, the damping ratio or Q factor for the spring-dashpot network can be specified.

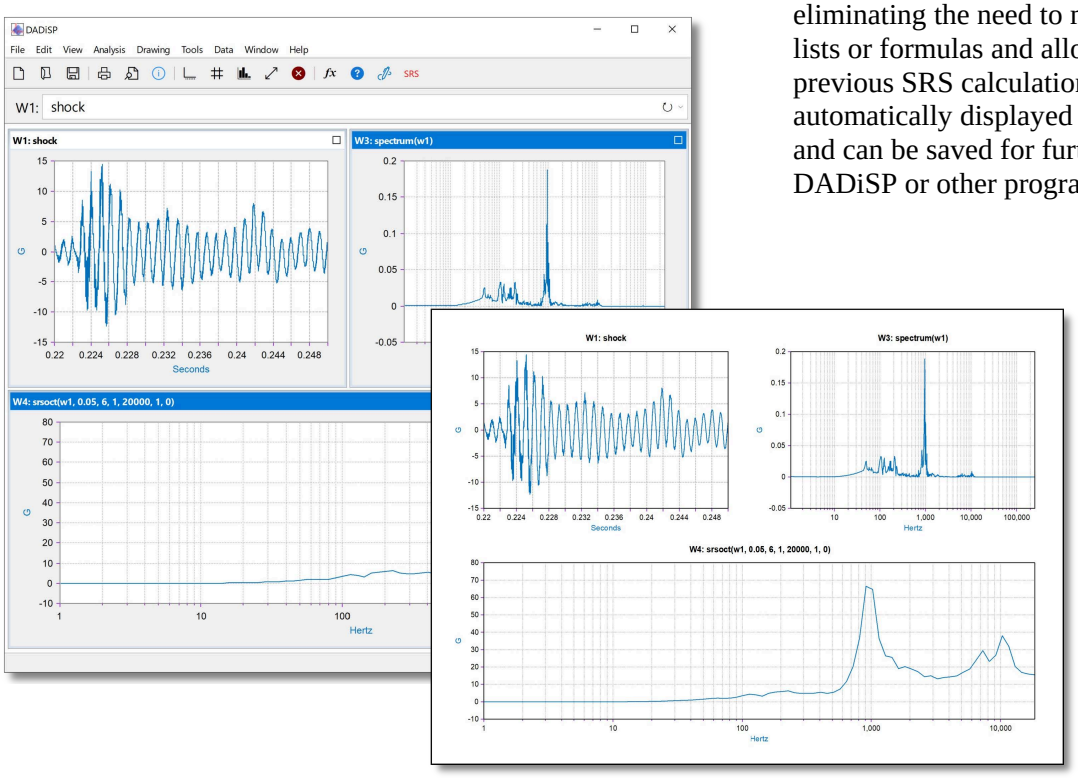


Octave or Linear Natural Frequencies

The natuaral frequency range of interest can be specified in octave, fractional octave or linear bands to produce comprehensive SRS results. Whole octave and 1/N fractional octave bands provide SRS information over a wide natural frequency range with a minimum of computation. Linear frequency ranges are useful to produce high resolution SRS results for a narrow band of frequencies. Once computed, any SRS can be plotted with linear, log or log-log axes.

Fully Integrated

The SRS module is fully integrated with DADiSP to provide a complete shock analysis, display and processing environment. The DADiSP/SRS user interface is dialog based, eliminating the need to memorize argument lists or formulas and allows quick recall of previous SRS calculations. The SRS results are automatically displayed in a DADiSP window and can be saved for further processing by DADiSP or other programs.



SRS Functions

srsoct	SRS calculation for octave spaced frequencies
srslin	SRS calculation for linear spaced frequencies
srscoef	Convert SRS SDOF analog system to digital domain