



CATS™ Shock Synthesis

PUMA
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* Computer-Aided Test Suite

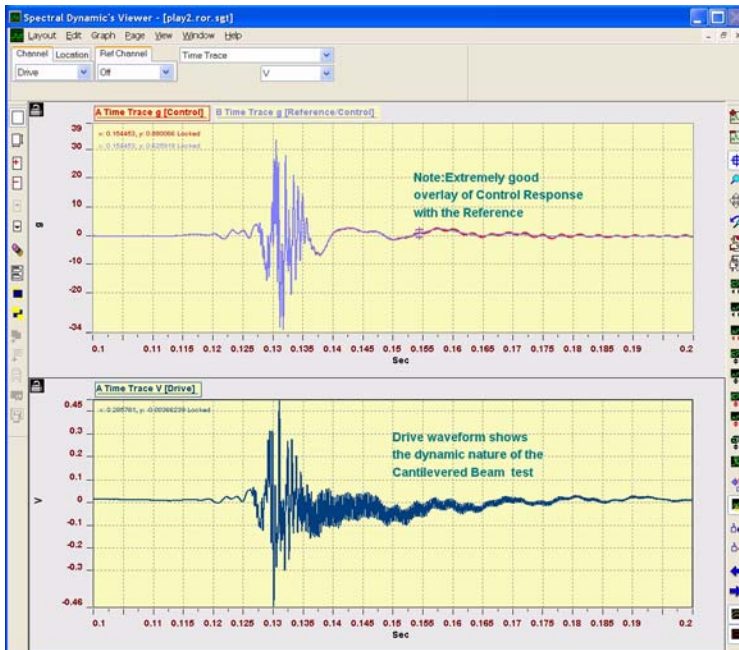


Figure 1

CATS™ SRS Synthesis provides a robust capability to generate a nearly unlimited number of waveforms that will match your specified SRS.

Transients may be manually or automatically generated from either damped sine or wavelet components with user specified optimization

Adaptive Control allows PUMA to learn your structure and rapidly resolve its unique dynamic characteristics (*including phase changes during the test*), producing very accurate tests.

Exceptionally powerful Digital Signal Processing permits many parallel computations so all channels and resultant data may be viewed instantly and simultaneously.

- SRS analysis capability from 1/1 octave to 1/24 octave
- Automatic wavelet synthesis and convergence from SRS reference
- Optimization for time, displacement or acceleration
- Extensive wavelet editing capabilities
- Patented adaptive control technique for control of non-linear dynamics *Not "Once per Test System ID"*
- Sophisticated drive compensation management to decrease equalization time for repetitive tests
- Direct "Office" Reporting with PDF creation

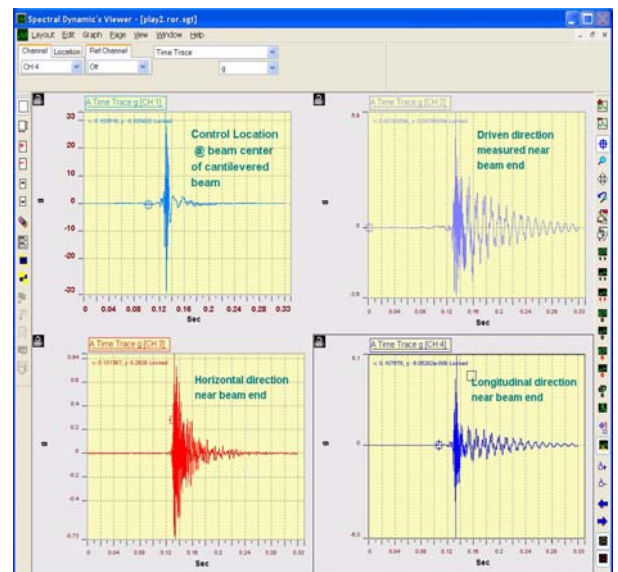


Figure 2

Control Methods		Safety Features	
Control loop	Patented adaptive control algorithm with transfer function magnitude and phase updating and coherence smoothing to properly compensate for non-linearity or time varying changes in the dynamic load	Shaker limits	Pretest verification that spectrum dynamic limits are within shaker operational limits(acceleration, velocity, displacement and voltage) User-selectable, 1 to 5,000 mVrms
Control Performance		Loop check max. drive	User-selectable, 1 to 1,000 mVrms
Dynamic range	Up to 90 dB	Loop check max. noise	0.01 to 100 %
SRS Reference		Max average error alarm	0.01 to 100 %
Definition	Can be easily defined with up to 100 frequency breakpoints	Max peak error alarm	0.01 to 100 %
Reference SRS type	Primary +, Primary -, Maxi-max	Max peak error abort	0.01 to 100 %
Reference tolerance bands	Automatically generated, defined in % or dB	Control signal loss	Continuous automatic detection
Frequency range	25 Hz to 10 kHz; dependent on pulse duration and over-sample ratio	Maximum drive signal	0.01 to 12V peak
Over-sample ratio	User selectable, 5.12, 10.24, 20.48 times the control frequency range	Test Automation	
Number of decades	Up to 3	Automatic level increase	User-selectable initial level, level increment, delay between pulses; re-equalization between each pulse
Analysis octave spacing	1/1, 1/3, 1/6, 1/12, 1/24 Octave (ANSI standard)	Multiple pulse	User-selectable number of full level pulses and delay between pulses
Shock filter definition	Absolute Acceleration, Relative Displacement	Channel Setup	
SRS damping	User selectable from 0.1 to 99% (% of critical)	Channel type	Control, auxiliary, inactive
Units	g-in/s-in; g-m/s-mm, m/s ² -m/s-mm	Sensitivity	0.001 to 999,999 mV/g
Shock Synthesis		Channel loop check	Enabled, disabled
Reference pulse synthesis	Automatic synthesis from user-defined SRS with selectable average and peak error	Channel label	Up to 20 characters for each channel
Reference pulses	Wavelets of damped Sines	Transducer serial number	Up to 10 characters for each channel
Wavelet parameters	Polarity, frequency, amplitude, number of half Sines, delay; automatically generated, user selectable or both; automatic convergence to reference SRS	Transducer Power	Constant current source On or Off
Damped sine parameters	Polarity, frequency, amplitude, damping, delay; automatically generated, user selectable or both; automatic convergence to reference SRS	On-Line Analysis	
Pulse optimization	Time, displacement, peak acceleration	Real-time analysis	Pulses and spectra for 1 to all available channels simultaneously displayed
SRS convergence criteria	Average error, peak error	Time functions	Control, drive, error, and auxiliary waveforms
Pulse duration	Minimum 0.4 ms	Display units	Acceleration, Velocity, and Displacement
Buffer Duration	10 ms to 64 seconds	SRS displays	Maxi-max; Primary +, Primary -, Residual +, and Residual -
Pulse dynamic limits	Maximum input voltage, max/min acceleration, max/min velocity, max/min displacement, calculated and displayed	Cursors	X and Y value readout, peak search, trace tagging, multi-window locked positioning
Control Parameters		Scaling of display	Log/linear, auto-scaled/fixe, full control
Mode of operation	Manual, semiautomatic, automatic	Data Storage	
Number of control channels	Any one channel selectable as control	Data storage setup	Every pulse, last pulse, off
Repetitive pulses	1 to 1,000,000	Playback	Scan through the entire test data file, with adjustable delay
Delay between pulses	0 to 8,000 ms	Record annotation	Complete Tagging of each record with either static or dynamically changing info
Control Strategy		Test summary	Fully documented post-test summary, easily printed or incorporated into any document using standard word processing software
Pre-stored drive	User-selectable, No/Yes	Run message log	Text file records all system status messages displayed during test run
Drive update	Off, on (equalization function updated after every pulse)	Data Reporting	
Output polarity	+/-	Automated report generation utilizing MS Word	
Weighting for averaging	User-selectable: 0.05 to 1		
Feedback gain	User-selectable: 0.05 to 1		
Equalization method	Transfer function		
Equalization level	0 to -80 dB		
Input for equalization	Pulse, random, pseudo random		
Non-Linearity Adjustment Factor	NLAF # set 0.5 to 2.0		
Waveform trend removal	Disable, enable (removes DC offset before integrating from Acceleration to Velocity or Displacement).		
Start-up Parameters			
Initial test level	Equalization level to 0 dB		
Level increment	1 to 20 dB		
Equalization delay	0.0 to 8,000 ms		



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