Processing and Review Interface for Strong Motion Data (PRISM) Software Version 2.0
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Abstract
PRISM automates the processing of strong-motion records by providing batch-processing capabilities.

The software consists of two components:

- A record processing engine (command line interface) composed of modules for each processing step.
- A graphical user interface (GUI) for manual review, edit and processing.

Main Features
- Platform-independent, modular, extensible and open-source;
- Customizable processing parameters with a configuration file;
- Phase-time and maximum amplitude picking;
- Time-domain mean-removal, integration and differentiation;
- Frequency-domain resampling;
- Acausal bandpass filtering;
- Baseline correction determined from the velocity time series and removed from the acceleration time series in time domain;
- Filtering performed on the acceleration time series in time domain;
- Generation of products that include compatible acceleration, velocity and displacement time series, response spectra, Fourier amplitude spectra, and standard earthquake-engineering intensity measures;
- Log files for quality control and reproducibility;
- For input, currently uses Consortium of Organizations for Strong-Motion Observation Systems (COSMOS) V0 input format with metadata in COSMOS headers; and
- Products in COSMOS data format (V1, V2 and V3).

What’s New in PRISM 2.0
- Frequency-domain integration;
- Frequency-domain decimation;
- Auto-detecting spikes and removal;
- Signal-to-noise ratio (SNR) thresholding; and
- Auto-detecting bandpass filter corner frequencies.

Volume - 1 Processing

Volume - 2 Processing
Step - 1: Resampling to 200 sps (if needed)
Step - 2: Event onset detection
Step - 3: Pre-event mean removal
Step - 4: First order baseline correction (velocity domain)
Step - 5: QC
Step - 6a: Bandpass filter with acausal filter (acc. domain)
Step - 6b: Adaptive baseline correction (ABC)
Step - 7: Compute acceleration, velocity and displacement;
Step - 8: Decimate to original sampling rate (if needed)

Volume - 3 Processing
1) Pseudo acceleration, velocity and displacement spectra at 2, 5, 10 and 20% damping,
2) Fourier Amplitude Spectrum, and
3) IMs:
- Acausal bandpass filter acceleration
- Integrate acceleration to velocity
- Find best fit trend
- Differentiate best fit trend
- Copy of acceleration with pre-event mean removed
- Acceleration with pre-event mean removed
- Integrate to velocity
- Remove pre-event mean
- No trend to remove from acceleration (V1)
- Remove best fit trend from acceleration (V2)
- Signal-to-noise ratio (SNR) thresholding
- Frequency-domain decimation
- Frequency-domain integration
- Frequency-domain resampling
- Frequency-domain decimation

Frequency-domain Decimation
Replaces spikes (outliers) exceeding the dynamic threshold value by interpolating among previous and subsequent data points.

Spike Removal

Take-home Message
PRISM 2.0 provides greater flexibility and increased processing accuracy for strong motion data.