

Measuring amplitudes in SHM

Determination of displacement amplitudes is an important part in routine analysis of waveforms. Since true ground motion has to be estimated, the transfer function of the recording instrument must be taken into account. In former times only narrow-banded instruments were available. From such records amplitudes and magnitudes were determined. For reasons of continuity the common magnitude determinations still use simulations of such historical standard instruments. The body wave magnitude m_b is read from WWSSN-SP records, the surface wave magnitude M_s from SRO-LP and the local magnitude M_l from Wood-Anderson simulations. Together with the amplitude of the recorded (or better: simulated) signal also its period must be estimated. Dividing the signal amplitude by the value of the transfer function at the given period gives a rough estimation of the ground motion at this period.

In order to perform this operations the transfer function of the recording system must be presented to SHM in some form. The way it is implemented is via an FFT filter file (.FLF-file). For each simulated instrument which will be used for amplitude determination such a filter file must exist in $\$SH_FILTER$. The naming convention is $TF_DSP_S+<instrname>.FLF$ (e.g. $TF_DSP_S+SRO_LP.FLF$, for SRO-LP instruments). If also $TF_VEL_S+<instrname>.FLF$ is specified (the velocity transfer function, which differs by an integration from the DSP-version) the velocity amplitude is additionally computed. If the record has been created by a simulation filter, the transfer function has been already used in this simulation filter (see [Working with simulation filters](#)). That means the same transfer function that went into the simulation filter (which was there multiplied with the inverse of the recording system) is the content of these $TF_DSP_S+<instrname>.FLF$ and $TF_VEL_S+<instrname>.FLF$ files.

Please have a look at the existing files in $\$SH_FILTER$. For example a set of files is $TF_DSP_S+WWSSN_LP.FLF$, $TF_VEL_S+WWSSN_LP.FLF$, $TF_VEL_GRSN.FLF$, $GRSN_S+WWSSN_LP.FLF$. You may also view such files with the [filter display](#) option.

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