

The function which reads measurements of a given signal in the HDR format

Purpose.

This function is to read measurements of a discrete process from a file as recorded by a seismic station.

The programming system:

MATLAB

The data:

- Discrete measured values as recorded by a seismic station: two files with header and data proper,
- the number of the channel containing measurements,
- initial time shift in seconds,
- duration of the interval from which the data are read.

Output:

- an array of real-valued numbers corresponding to measurements,
- sampling step.

The algorithm.

The measurements as recorded by a seismic station are transmitted as two text files. The first of these files contains a header for the data file (header file):

- number of measurements,
- number of channels,
- data format,
- date and time when the recording began,
- sampling step,
- list of parameter identifiers.

The second file contains the measurements. These are stored as discrete uniform time sequences in the order specified in the header, i.e., first the number of measurements of the first process, then that of the second process, and so on.

First, summary parameters are read from the header file. Then, in accordance with the data format, an output array of X measurements is generated in the file that contains the measurements and given original data.

The function which reads signal measurements as recorded in the CM6 format.

This function is to read measurements of discrete processes as recorded in the file in the CM6 format (.GSE files).

The programming system: MATLAB

The data:

- a file containing the measurements of discrete processes as recorded in the CM6 gse format.

Output:

- arrays of real-valued numbers corresponding to measurements of recorded processes,
- summary information (date and time when the recording began, station identifier, channel names, data type, number of measurements, etc.).

The algorithm.

Measurements as recorded by a seismic station are written in encoded form to a file. Just before the array is stored, the summary information is written to the header file, as follows:

- WID2, the code word signaling the header start,
- Data in the format yyyy/mm/dd,
- Time in the format hh:mm:ss.sss,
- Station identifier,
- Channel name,
- Code word designating the data type,
- Number of measurements
- Sampling frequency,
- Other additional information.

A single data file may contain several independent processes.

A user interface has been developed for inputting and spectral processing of seismic records of local earthquakes. The interactive program is in the MATLAB programming system.

A description of program interface

When the program which reads measurements of a given signal is started, the operating window appears on the screen. The header displays the program name. The data file (the default extension is HDR) is open through the File menu/Open Data File.

From the header file the program reads the summary information of measurements (Nsamp the number of measurements, Nchan the number of channels, Format the data format, Start the date and time of data recording, DT sampling step), performs the required computations and displays on the screen Summary Information of Measurements: sampling step, sampling frequency, number of measurements, model order, resampling ratio, initial time shift, duration of read interval, list of channels.

After this the measurements are plotted through the Data Preprocessing button in the Plots menu over the entire interval being read (see Fig.2.1.1).

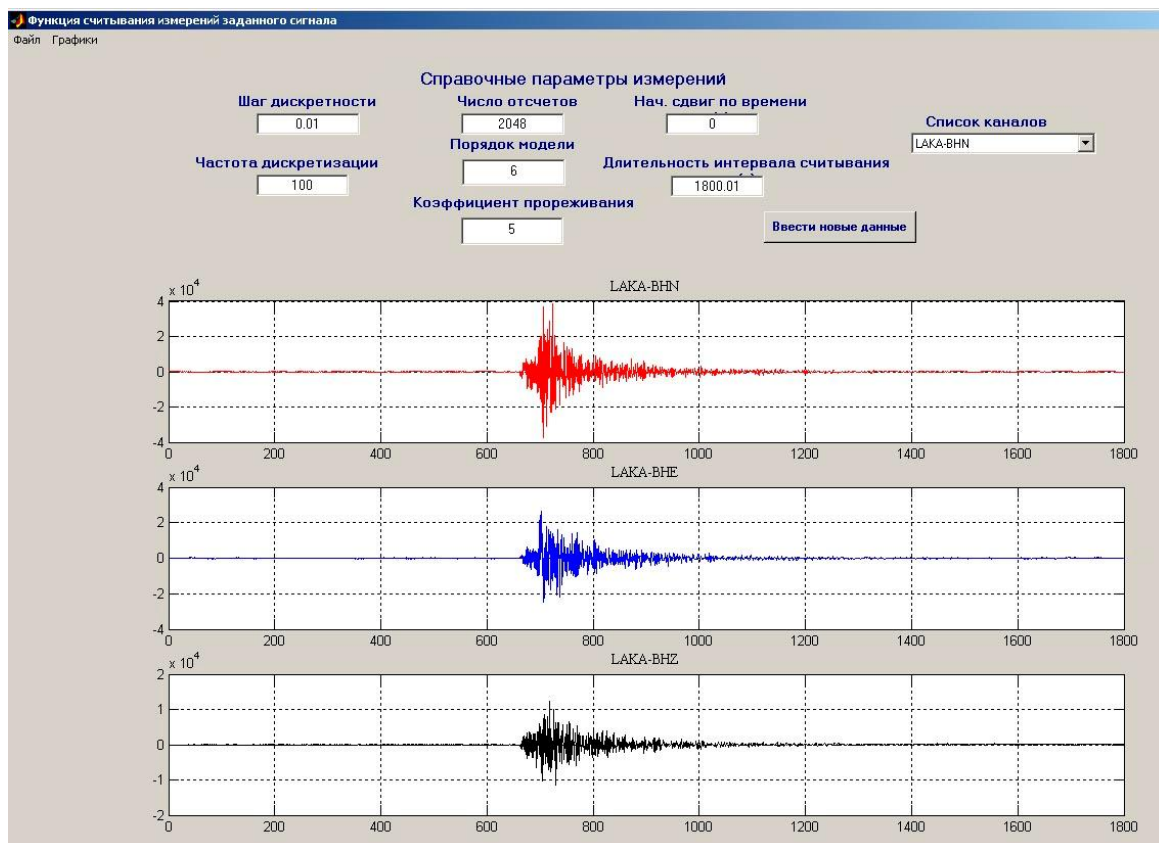


Fig. 2.1.1 A general view of the data preprocessing window.

The duration of read interval is plotted along the horizontal axis and the signal spectral amplitude along the vertical. Above each plot is the name of measurement channel.

After constructing the preliminary plots, the user can modify the data and replot by pressing the New Data Input button.

The program also allows plotting in a log scale along the horizontal or along both axes (see Fig.2.1.2).

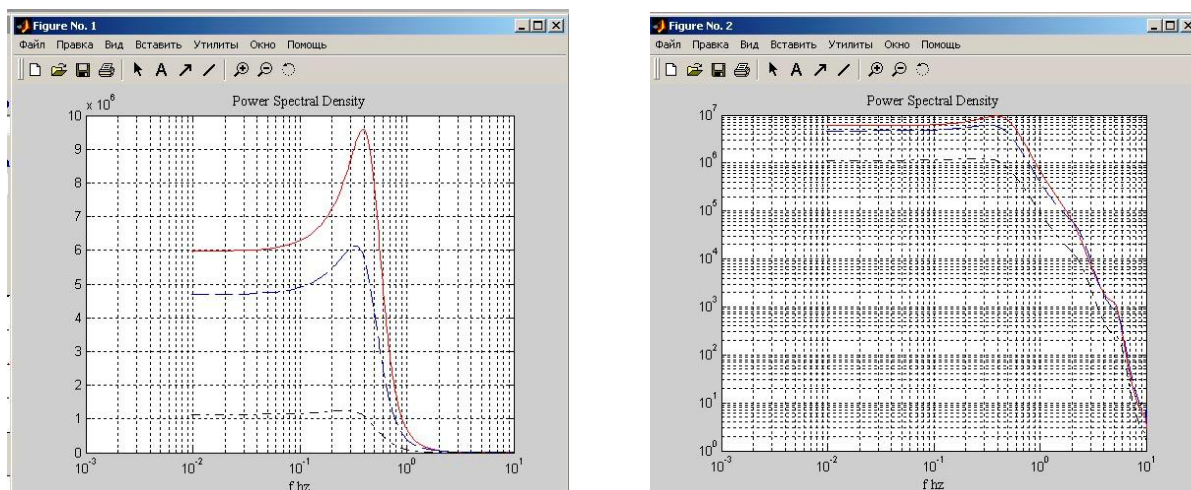


Fig. 2.1.2. Examples of plots made by the spectral processing program as applied to seismic records of local earthquakes.