

Nizhnij Tagil real school in the mining college". The article focuses on the changes, which introduced in college, the new training program, the management of the college and teachers. A very important point in the publication is the fact that the mining college was entirely financed at the expense of factories of P.P.Demidov's heirs. Students of mining college had been doing practical work in laboratories, museums, workshops, factories and mines. In addition, the free school took the children of workers of the factories of Nizhnij Tagil. Students who have completed a full course of study, in turn, were required to spend one year in practical training in their chosen specialty at one of the plants of P.P.Demidov's heirs. Previously, based on information from publication I. Poletika, in this article we drew attention to the lack of specialized educational institutions. As you can see from the release in 1896, the Demidov dynasty undertook control measures not only in matters directly concerning the plants, but also other issues of the industry.

Thus, by analyzing the publication in "Gornyj Zhurnal", note that the activities of Demidovs were aimed at the development of the mining and metallurgical industry. Caring about affluence, Demidovs did not forget about the industry in general, its importance to the state. The industrialists participated in various events to improve production, introduced new equipment and new technologies. Not spared in this finance, they purchased high-quality foreign hardware. Demidovs have established international relations, visited the foreign factories and mines, learning international experience. The representatives of the dynasty contributed to the expansion of specialized educational institutions, the emergence of new schools. In addition, funds received on the Demidovs plants, were used for training workers in foreign factories and other goals. The activity of Demidov dynasty made a huge contribution in economic and social sphere of our country.

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#### USING A FFT-BANDSTOP-FILTER AT SEISMIC DATA PROCESSING

Kpata Mc Egni Richmond Eloge, A.A. Islyamova

Scientific advisor professor M.M. Nemirovich-Danchenko

National Research Tomsk Polytechnic University, Tomsk, Russia

Development of methodology of detection of fractured (porous) regions in the rocks is always represented an actual problem for a wide range of applied geophysics [1]. In cases where defective regions are multiple fracture zone (fractured zone) are effective electromagnetic and acoustic techniques and combinations thereof. Acoustic methods based on the study of the properties of elastic wave fields in active and passive monitoring of media containing fractured zones used especially widely in mining and in the search for hydrocarbon deposits, and in the latter case, developing a natural acoustic methods (acoustic logging), and seismic methods which use both longitudinal and transverse waves [1]. For the analysis of real seismic sections need to properly use the device processing time series of digital filters. Typically, such processing is performed in the spectral plane. To display the starting number of the Fourier transform to the frequency domain used by us [2] and Prony [3]. An example of operation in the filter window when using the Fourier spectrum.

For Fourier transform limitations associated with the Nyquist theorem and imposed the finite size of the processing units do not allow to extract from the track with any harmonic components, prescribed, frequency. To work around this limitation, the previously applied transform Prony, which is not the spectral transformation in pure form, but is a way of estimation (as a method of least squares) of discrete data using a linear combination of exponential functions. You can then calculate the power spectral density for any Prony frequency. On the basis of this was shown the possibility of allocating fractures in the rock [4]. Below are some details of the implementation task algorithmic filtering.

Here is the basic formula for the direct and inverse Fourier transform.

Under the spectrum of the function  $g(t)$  we mean a  $G(\omega)$  function associated with  $g(t)$  a pair of Fourier transforms [2]

$$\begin{aligned} g(t) &= \frac{1}{2\pi} \int_{-\infty}^{+\infty} G(\omega) e^{-i\omega t} d\omega \\ G(\omega) &= \int_{-\infty}^{+\infty} g(t) e^{-i\omega t} dt \end{aligned} \quad (1)$$

It uses standard notation  $\omega = 2\pi f = \frac{2\pi}{T}$ ,

Where  $T$  – the main period of oscillation

Formula (1) contain the variable  $t$ . This can be a time, which usually means a ( $f$  - frequency temporal dimension with  $T$ -1), but may be a spatial variable (instead  $f$  then write  $k$ , is the spatial frequency with the dimension  $L$ -1).

In both cases - for the Fourier spectrum [2], and for the Prony spectra [3] - there are various aspects in the performance of the actual filter. This paper shows how to correctly apply the band-stop filter when working in Matlab package. Under the band-stop filter is meant the following algorithm : the complex spectrum of several selected frequencies are reset in

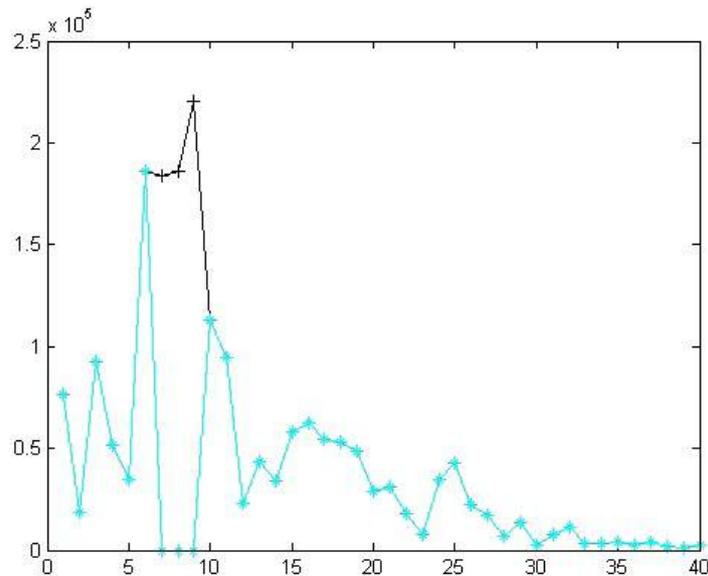
compliance with the symmetry with respect to the Nyquist frequency [5] (in the case of Fourier transformation) or its analogue (for Prony conversion). Then, for the obtained complex array inverse transformation is performed.

The program is read from the file format \*.seg, analysis of the recording format and preparation for filtering. Actually the result of the comparison matrix on the mask is filtering. The mask in this case - is a vector  $\mathbf{M} = [1, 1, 1, \dots, 0, 0, 0, \dots, 1, 1, 1]$ . Stored frequencies correspond to the units. If the spectrum of the track in the selected window is denoted SF, after performing the comparison on the mask M in the line Rez get filtered spectrum:

$$\mathbf{Rez} = \mathbf{SF} * \mathbf{M} \quad (2)$$

The figure shows two spectra - SF before treatment and after treatment Rez. Good results can be seen cut in the carrier frequency band.

Generally speaking, the pseudo-slit may be composed of the tracks and containing only the amplitude spectra. And for a quick decision to choose the strategy of adaptive search areas with possible high content of hydrocarbons, and this may not be enough. The incision of spectral densities, composed of such «tracks» will include sustained lateral gaps in the areas of dedicated, as shown by model calculations, to the productive areas of the geological section [4].



*Fig. Fourier spectrum (SF in (2)) before treatment (curve with «+») and after treatment Rez (curve with «\*»)*

It is important to remember that (as a rule), we are dealing with a fast Fourier transform algorithm. Therefore, it should be noted that the size of the selected window treatments of N in the case of the Fourier transform is equal to the Nyquist frequency  $f_N = N / 2$  (it is dimensionless, it determines the number of harmonics, ie, pieces); at the same time for a given value  $\Delta t$  reference cutoff frequency

$f_{gr} = 1 / (2\Delta t)$  (a value dimension, Hz). For example, if the window size is  $N = 64$ , and  $\Delta t = 0.002$  s, then  $f_N = 32$ ,  $f_{gr} = 250$  Hz and a harmonic processing window corresponds to  $250/32 = 7.8125$  Hz. And for the selected window and a fixed reference value is the number of 7.8125 Hz is not changed.

In the case of conversion itself Prony frequency selection method from a range  $-(2\Delta t)^{-1} \leq f_k \leq (2\Delta t)^{-1}$ , determines the variation of frequencies changing signal properties. Thus each number («harmonic») in the Prony series will correspond to a particular frequency in Hz, and certain bandwidth. The behavior of these bandwidths is a separate methodological interest in the processing and interpretation of geophysical data.

It is also necessary to add that the interpreter always deals only with windowing, even when working with the whole route. These features should be taken into account when building bandstop (notch) filters (in English terminology notch filter).

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