

**STUDY ON THE WAVELET ANALYSIS IN THE NON-
STATIONARY VIBRATION SIGNAL OF
COURSE OF LIJIAXIA HYDROPOWER STATION UNITS'
START UP-SHUT OFF**

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Wavelet analysis is a new kind of transformation analytical method. It is another glorious model that combines perfectly of pure mathematics and applied mathematics after FFT, enjoying the title of "mathematics microscope". In the realm of application, especially the signal processing, picture processing, speech analysis, mode identification, quantum physics, swift flow and numerous nonlinear science etc. realm, it is considered to be the great breakthrough on the tool and method in recent years. Wavelet analysis is a kind of time-frequency analytical method, having the good part character in the time and frequency domain at the same time.

Traditional method on signal processing is FFT method, though it is very convenient to process stationary signal, it is can't process the non-stationary well. So we have to seek wavelet's help. Based on the spot experiment of Liji Xia hydropower station of two-row placed units, wavelet and wavelet packet analysis method are applied to decompose the non-stationary signal into different channels in this paper. Then we extract the weak information and useful components of the signal, finally process the analysis of vibration source and gain the main vibration source which caused the structure vibration in the course of units' start up and shut off. The study confirms that the wavelet method is the most powerful tool to non-stationary signal processing.

The experience of operation indicates that the major troubles of the hydropower-station take place in the course of non-stationary. At this time, abnormal runaway and breaking work condition occur to turbine. In these work conditions, dynamic load coming from the system is the biggest, in which are in company with the variety of water flow, the variety of units operation, the unsteadiness of the current increase and appearing the strong pulsation, vibration and water-hammer phenomenon. The sources of vibration signal which is corresponding to the course are various and complicated, even interblend with each other. It is inconvenient to identify and analyze. Moreover, the ratio which non-stationary work conditions occupy the all hydropower-station work conditions has the trend of increase. So studying the units' operation in the course of non-stationary has significance to guarantee the credibility of units' operation and decrease the investment. This paper enumerates the typical courses of non-stationary----starting up and shutting off to analyze. The result proved very ideal.

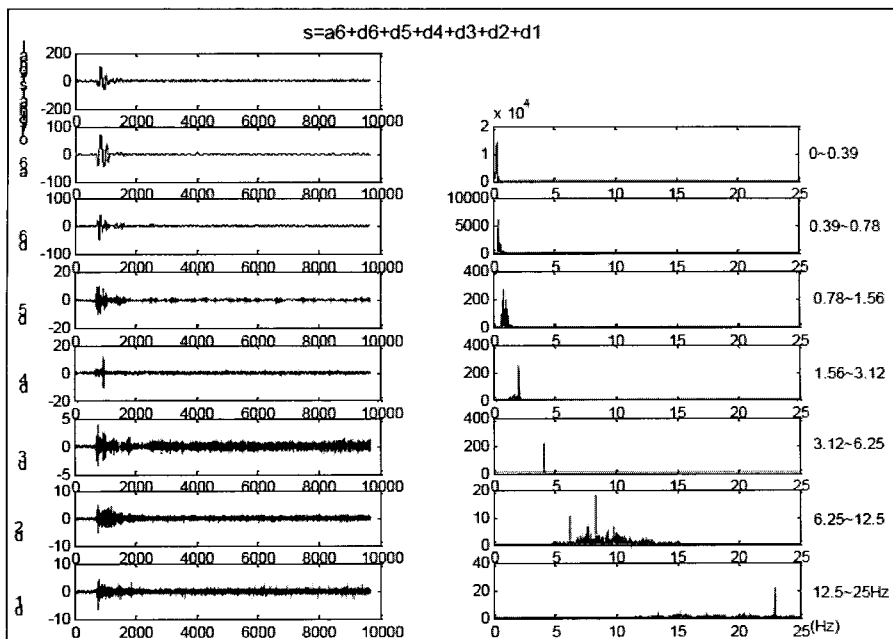


Fig. 1 The foundation of stator consequent vibration displacement signal's db6 wavelet decomposition while starting NO. 2 unit

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