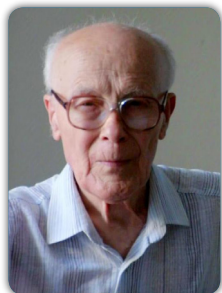5th International Conference on

Big Data Analysis and Data Mining

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V Znak

The Institute of Computational Mathematics and Mathematical Geophysics of SB, Russia

Some untraditional approaches to the processing of periodic signals, their analysis and estimating specific peculiarities

The periodic (harmonic and FM) signals are widely used. We will treat them as time-series and these time-series must often be processed, or filtered to extract some information of interest. Traditionally, this filtering has been linear and certainly, linear filters have a sound theoretical basis and have been extensively studied. Unfortunately, linear filters suffer from poor performance in many applications. We are focused on the processing of periodic signals by the order filters and the studying of their characteristics based on cluster analysis. A model of a periodic signal will be treated as the numerical sequence $Y=\{y_1,…, y_N\}$, which reflects the behavior of some real process in a discrete time $t_1,…, t_N$, where $t_i – t_{i-1} =\Delta t = const$, $i=2,…, N$. Order filters belong to the class statistic selection filters, where the filter output is restricted to be one of the input samples. Because of nonlinearity of such filters, the analytical studying their behavior is very complicated. At the same time, restrictions of the processing of periodic signals by such filters exist. Therefore, the approach of adapting weighted order statistics (WOS) filters and the use of the method of statistical trials for selecting the most effective project of the WOS filters (Data Mining, Intelligent Processing) is drawing attention. As for estimating specific peculiarities of periodic signals, the attention is paid to the cluster analysis and to the method of statistical trials also.

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