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# Analysis of human EEG to identify pathological conditions using nonlinear dynamics methods

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*Abstract*: The paper proposes a methodology for the study of human electroencephalograms (EEG) on the basis of mathematical methods of nonlinear dynamics and statistical data processing for the detection and classification of pathological conditions such as schizophrenia or epilepsy. The applicability of various methods of EEG signal purification and their combinations for optimal results is studied. As cleaning methods are used: principal component analysis (PCA), the empirical mode decomposition method, the method of cleaning on the basis of the wavelet transformation. To determine the degree of chaotization of signals, the values of the largest Lyapunov exponent are calculated using the Wolf and Rosenstein algorithms, entropy as well as the spectral power density of the signals are also calculated. The described methods have been successfully tested on the basis of data of patients with schizophrenia of the Moscow State University and the characteristics of signals corresponding to the normal and pathological condition of a conditionally healthy and conditionally sick person have been determined.

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