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Entropy-based measures of complexity in the assessment of heart rate variability: a theoretical approach

Recently, in a study of heart rate variability and other physiological data, growing attention has been paid to entropy-based complexity measures, among which are Approximate Entropy, Sample Entropy, Fuzzy Entropy, local entropies and some others. Mathematical components of their definitions will be presented with the stress on the problems of vulnerability to noise, loss of data, relative consistency, dependence on sample length and sensitivity to the input parameters. The usefulness of the above methods to distinguish time series with respect to their irregularity and unpredictability will be discussed and tested on various kinds of stochastic, nonlinear and physiological data.