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Abstract

Ordinal Pattern Based Analysis: From Change Probabilities to Asymmetries †

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The analysis of ordinal pattern distributions provides a relatively new and interesting approach to nonlinear time series analysis leading, for example, to the concept of permutation entropy. Data analysis methods based on ordinal patterns have been applied in different fields of research such as biomedicine, econophysics and engineering. Main reasons for the increasing success of these analysis methods are that ordinal patterns contain intrinsic information on the dynamical structure of a system and that ordinal pattern-based methods are robust and simple from a computational viewpoint.

Whereas some nice asymptotic results have been found for pattern length going to infinity, in practical data analysis short patterns describing certain features of data and models behind them are of some special interest. We demonstrate this point by discussing some statistics based on counting monotone changes and on considering asymmetries in ordinal pattern distributions. The data analysis methods obtained on this base are illustrated by considering some real world data.

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