

Conditional Permutation Entropy as a Measure for the Complexity of Dynamical Systems [†]

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An important but difficult problem in the analysis of dynamical systems consists in determining the system's complexity, analytically and on the basis of given data. As a new approach to this problem, in 2002, Bandt and Pompe introduced the permutation entropy. Their method depends on the distribution of so called "ordinal patterns", which are based on the relative ordering between different values. Since this approach has many theoretical and practical advantages over alternative methods, it has been successfully applied to various real-world problems. However, it is still not completely understood on a theoretical level. In this presentation we will investigate conditional variants of the permutation entropy that were first mentioned in 2014. Two closely related types of conditional permutation entropy will be considered and compared mathematically. Additionally, we will show how this conditional permutation entropy is related to the non-conditional variant. Finally, we will demonstrate why the conditional permutation entropy can be a more efficient measure for complexity than the original permutation entropy.



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