

# Symbolic Transfer Entropy, Permutation Transfer Entropy and Transcript Mutual Information for the assessment of heart rate and systolic blood pressure coupling

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We study the difference between directionality indicators based on transfer entropy as well as on its dimensional reduction via transcripts in algebraic time series representations. In the applications, we consider specifically the lowest dimensional case, i.e., 3-dimensional transfer entropy, which is currently one of the most popular causality indicators, and the (2-dimensional) mutual information of transcripts. Needless to say, the lower dimensionality of the transcript-based indicator can make a difference in practice, where datasets are usually small. To compare numerically the performance of both directionality indicators real-world data (in the form of biomedical recordings) are used. We found that the transcript mutual information performs as good as, and in some cases even better than, the lowest dimensional binned and symbolic transfer entropy, the symbols being ordinal patterns.

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