

Abstract Submitted  
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**Intrinsic Transfer Entropy**<sup>1</sup> RYAN JAMES, Univ of California - Davis, BAHTI ZAKIROV, College of Staten Island, JAMES CRUTCHFIELD, Univ of California - Davis — Quantifying information flow within a system is paramount to understanding its behavior. One common, though flawed, method of doing this is via the *transfer entropy*. The transfer entropy is a particular form of conditional mutual information, which captures both *intrinsic dependence* between variables as well as *conditional dependence*. Here, we propose a new method of quantifying information flow, the *intrinsic transfer entropy*. Rather than utilizing the conditional mutual information, intrinsic transfer entropy uses the *intrinsic mutual information* from information-theoretic cryptography. This provides for the first time a concrete method of separately quantifying intrinsic information flow from conditional information flow. We apply this measure to a variety of systems to demonstrate its usefulness.

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Ryan James  
Univ of California - Davis

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