

UTSA College of Business
Department of Management Science and Statistics
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“On the the Role of Higher Order Topological Properties
in Functionality of Complex Networks”

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Abstract

The tools of algebraic topology, such persistent homologies, or analysis of properties of progressively finer simplicial complexes, allow to unveil some critical characteristics behind organization of complex networks and interactions of their components at multi-scale levels, which are otherwise largely inaccessible with conventional analytical approaches.

We discuss utility of persistent homologies in enhancing statistical analysis of hidden mechanisms behind functionality and robustness of complex weighted time-evolving networks in a broad range of real-world scenarios, from power grid reliability to blockchain predictive analytics.