

**Abstract for GR-TR Conference on Statistical Mechanics  
and Dynamical Systems**

Talk Invited

Invited Talk

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**Does the functional network reveal the topological  
organization ?**

Tiago Pereira\*

Center for Mathematics, Computation and Cognition, Universidade Federal do  
ABC, Sao Paulo, Brazil

\* Electronic Address: [tiago.pereira@ufabc.edu.br](mailto:tiago.pereira@ufabc.edu.br)

Real world complex systems can be viewed and described as networks of interacting elements. Here, we distinguish the structure of the network, the nature of the interaction, and the dynamics of the nodes. Experimental results typically do not access the network structure, which is then inferred by the dynamics of the nodes. From the dynamics of the nodes one then constructs a network of functional relations, termed functional network. It is generally believed that the functional network reflects the structural organization of the network. A fundamental question towards the understanding of complex systems concerns the relation between functional and structural network. Using synchronization as a paradigm for network functioning, we show that the functional network, given by the pairwise synchronization, can drastically differ from the topological network. We uncover the mechanism for this abrupt change between functional and structural networks and unveil the topological implications on the network functioning.