DUCAT
Distributed Network Computing through the Lens of Combinatorial Topology

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Distributed Computing and Combinatorial Topology

- autonomous processes
- no central coordination

Processes
Communication medium

Input complex
Protocol complex for $C_3$
Protocol complex for $S_3$
Output complex
Context and Objectives

• **Algorithms design and analysis:** establishing lower bounds or impossibility results is extremely difficult.

• **Combinatorial topology:** extensively used in the context of crash-prone asynchronous shared-memory (or message-passing).

• **Objective of DUCAT:** Extending these results to other models
  - Network computing
  - Dynamic networks
  - Beyond full-information protocols
Expected Outcomes

1. Complexity results: New lower bounds, but also new upper bounds

2. Better understanding of the nature of distributed computing

3. Unified framework for distributed computing