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THE WEIZMANN INSTITUTE OF SCIENCE  
FACULTY OF MATHEMATICS AND COMPUTER SCIENCE

Faculty Seminar

Room 155 ,Ziskind Building  
on Sunday, Jan 19, 2020at 11:15

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Verification of distributed protocols using decidable logics

Abstract:

Formal verification of infinite-state systems, and distributed systems in particular, is a long standing research goal. I will describe a series of works that develop a methodology for verifying distributed algorithms and systems using decidable logics, employing decomposition, abstraction, and user interaction. This methodology is implemented in an open-source tool, and has resulted in the first mechanized proofs of several important distributed protocols. I will also describe a novel approach to the problem of invariant inference based on a newly formalized duality between reachability and mathematical induction. The duality leads to a primal-dual search algorithm, and a prototype implementation already handles challenging examples that other state-of-the-art techniques cannot handle. I will briefly describe several other works, including a new optimization technique for deep learning computations that achieves significant speedups relative to existing deep learning frameworks.