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Christopher Dunn

Indiana University - Purdue University Fort Wayne

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A Genetic Algorithm for the Computation of Network Survivability

Christopher Dunn

Robert L. Sedlmeyer

Department of Computer Science

Indiana University-Purdue University Fort Wayne

Consider a network of computational nodes in which the topology and total computational workload are fixed. Each node is prone to failure, and the probability of failure is proportional to the workload assigned. We are interested in determining how to partition the workload among nodes to maximize network survivability. Survivability is defined as the probability that the network achieves its desired total computational workload in the presence of one or more node failures. We offer a graph-theoretic definition of survivability, discuss the computational complexity of maximizing survivability, derive a genetic algorithm for partitioning the total workload, and present experimental results.