Recent Progress on Fault Tolerant Spanners

Abstract:

Given a large input graph, a $k$-spanner is a sparse subgraph that preserves the shortest path distances of the original within an approximation factor of $k$. When this distance approximation is robust to $f$ failing nodes or edges, the spanner is $f$-fault tolerant. Fault tolerant spanners and their relatives arise commonly in networking and distributed computing. There has been a recent flurry of progress on fault tolerant spanners and their relatives, including faster construction algorithms and better tradeoffs between spanner size, error, and level of fault tolerance. We will survey this progress, spanning a sequence of 7 papers over the last 5 years. We will explain the new techniques that have enabled progress, the problems that have been solved, and the problems that remain open.