Finding One-to-Many Disjoint Shortest Paths in Hypercubes

Eddie Cheng, Oakland University, Ke Qiu*, Brock University, Zhizhang Shen, Plymouth State University

We study the problem of finding shortest and disjoint paths from one node to many other nodes in the hypercube. Previously, the problem has been studied for the case when the number of target nodes is n on an n-dimensional hypercube Q_n. Since these paths do not always exist, a necessary and sufficient condition for these paths to exist was found and efficient routing algorithms were developed should these paths exist. We will review the past work and develop a routing algorithm for the more general case when we have arbitrary number of target nodes.