

## 2-Shortest and Strong Shortest Path Union Cover for Networks

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### ABSTRACT

Interconnection networks play a key role in the design and implementation of communication networks and the recent advent of optic technology add more design problems. In general, an interconnection network may be modelled by a simple graph whose nodes represent components of the network and whose links represent physical communication links. Let  $G = (V, E)$  be a graph. Strong shortest path union cover  $S \subseteq V(G)$  is defined as for all  $e \in E(G)$ , there exists  $u \in S$  such that  $e$  lies on unique fixed shortest path  $u - v$  where  $v \in V(G)$ . Strong Shortest path Union covering number of a graph is the minimum cardinality among all strong shortest path union cover of  $G$  and it is denoted by  $SSPC_U(G)$ . The strong shortest path cover problem is to cover every edge of a known graph representing a network by the strong unique shortest paths from a subset of vertices in the graph. In this paper, we determine the 2-shortest path and strong shortest path union cover for Enhanced hypercube network  $Q_{n,2}$ , Augmented hypercube network  $AQ_n$ , and Crossed cube network  $CQ_n$ .

**Keywords:** Shortest paths union cover, Strong shortest paths union cover, Networks

