Graph Constructions Derived from Interconnection Networks

Richard Draper, Center for Computing Sciences, Institute for Defense Analyses

A class of interconnection networks for massively parallel processors are designed by taking copies of a building block network and wiring them together. For interconnection networks, the building block network is a complete graph and the wiring together is done by either a cycle or a complete graph. The process may be viewed as a way to construct a new graph from two component graphs. As such the component graphs may be generalized. The resulting graphs are not among the collection of product graphs familiar to graph theorist. Furthermore, one of these constructions leads to a very large number of graphs, some of which are provably not isomorphic.
This paper explains the unusual way the graph of an interconnection network is labeled and a matrix which is analogous to the adjacency matrix of a labeled graph. The constructions are presented along with the motivating interconnection networks.