Abstract

On computational complexity of design fault-tolerant graphs

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Fault-tolerant multiprocessors are widely used in different areas. Two types of failures in multiprocessor systems are interesting: processor failures and link failures. In 1976 Hayes in [1] proposed a graph-based model for the study of fault tolerance. Technical system Σ is associated labeled graph G, whose vertices correspond to elements of the system Σ, edges (or arcs) - relations between the elements, and labels indicate the type of elements. Under the fault of element of the system Σ refers to removing the corresponding vertex of the graph of G and all its associated edges. Later Harary and Hayes in [2] proposed the model to study the failures of links — edge fault tolerance. The system Σ^* is called *k-node(edge) fault-tolerant implementation* of the system Σ, if faults of any k elements(links) of Σ^* leads to the graph, which can be embedded graph of Σ given labels of vertices.

This talk is about computational complexity of design node and edge fault-tolerant systems. Proved that these problems are NP-complete.

References

[1] Hayes J. P. *A graph model for fault-tolerant computing system* // IEEE Trans. Comput. 1976. Vol. C.-25. ,9. P. 875–884.

[2] Harary F., Hayes J. P. *Edge fault tolerance in graphs* // Networks. 1993. Vol. 23. P. 135-142.