CONSTRUCTION SCHEMES OF THE OPTIMAL FAULT-TOLERANT NETWORKS FOR RINGS AND LINEAR ARRAYS

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ABSTRACT

AN INTERCONNECTION NETWORK CONNECTS THE PROCESSORS OF THE PARALLEL COMPUTER. THE RING AN -D LINEAR ARRAY NETWORKS ARE THE MOST FUNDAMENTAL TOPOLOGIES FOR INTERCONNECTION NETWORKS. THEY CAN BE USED TO SORTING AND SEARCHING DATA IN DISTRIBUTED SYSTEMS.A RING NETWORK IS AL -SO USED AS A CONNECTION STRUCTURE FOR LOCAL AREA NETWORKS,FOR EXAMPLE TOKEN RINGS.FAULT TOLERANCE IS ALSO AN IMPORTANT ISSUE ESPECIALLY WHEN THE SIZE OF AN INTERCONNECTION NETWOR -K IS LARGE. IN THIS THESIS,WE STUDY THE FAULT TOLERANCE PROPERTIES AND CONSTRUCTION SCHEM -ES FOR RING AND LINEAR ARRAY NETWORKS WITH BOTH NODES AND LINKS FAILURES. IN THIS THESIS,WE INTRODUCE THE CONCEPTS OF (NODE, EDGE) HAMILTONIAN-CONNECTIVITY AND ST RONGLY K-HAMILTONIAN GRAPH. FURTHERMORE,WE PRESENT CONSTRUCTION SCHEMES FOR FAULT-TOLERANT HAMILTONIAN AND HAMILTONIAN-CONNECTED NETWORKS. WE WILL STUDY A NEW CONCEPT, CALLED STRONGLY K-HAMILTONIAN GRAPHS, FOR THE FAULT TOLERANCE OF HAMILTONIAN GRAPHS. WE ALSO PRESENT TWO CONSTRUCTION SCHEMES FOR STRONGLY K-HAMILTONIAN GRAPHS INCLUDING (K + 2)-JOIN AND CARTESIAN PRODUCT WITH K2.APPLYING THESE SCHEMES,WE CAN CONSTRUCT MANY NEW STRONGLY K-HAMILTONIAN GRAPHS.

Keywords : K-HAMILTONIAN, (K+2)-JOIN, INTERCONNECTION NETWORK, (NODE, EDGE) HAMILTONIAN-CONNECTIVITY, STRONGLY K-HAMILTONIAN GRAPHS, CARTESIAN PRODUCT, FAULT TOLERANCE.

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