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Component allocation cost minimization for a multistate computer network subject to a reliability threshold using tabu search.

Summary: From the perspective of business management, system supervisors are usually more concerned with the cost of a system rather than its reliability. This study determines the optimal component allocation based on the cost criterion for a computer system subject to a reliability threshold in which the computer system is represented as a network composed of a set of links and a set of vertices. The component allocation means allocating some from the set of components to the network's links, where the cost of allocating a component is counted in terms of the length. Any computer network associated with a component allocation is called a multistate computer network (MCN) because each component has multiple states with a probability distribution. Associated with a component allocation, the system reliability is the probability that the specific units of data are successfully transmitted through the MCN. An optimization algorithm, which integrates tabu search and minimal paths, is proposed to solve the problem under consideration. Several benchmark computer networks are utilized to demonstrate the computational efficiency of the proposed algorithm compared with several popular meta-heuristic algorithms.

Keywords: multistate computer network; cost minimization; reliability threshold; tabu search; minimal paths