Abstract:

In the rendezvous search problem, k mobile agents must move along the n nodes of a network so as to minimize the time required to meet or rendezvous. When the mobile agents are identical and the network is anonymous, however, the resulting symmetry can make the problem difficult to solve. Symmetry is typically broken by having the mobile agents run either a randomized algorithm or different distributed algorithms. We investigate the use of tokens to break symmetry so that the mobile agents can run the same deterministic algorithm. After deriving the explicit conditions under which tokens can be used to break symmetry on the ring, we present several algorithms that use tokens to solve the rendezvous problem. We derive the lower bound for the memory required to solve the rendezvous problem and then determine the relationship between the rendezvous problem and the leader election problem among mobile agents.