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Enhancing Network Capacity by Weakening Community Structure in Scale-free Network

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Abstract. The community structure of the network will affect information transmission and the pronounced community structure will significantly reduce the network traffic capacity. In this paper, we propose a community weaken control strategy (CWCS) to enhance the network capacity by logically closing or cutting some links with high link importance to communities. We implement the strategy in both a global shortest-path routing policy and local routing policy, and compare it with the High-Degree-First strategy that removes the links among hub nodes. The simulation results show that the traffic capacity can be greatly enhanced and the average transport time is effectively reduced under the shortest path routing strategy. The traffic capacity can also be greatly enhanced under the local routing strategy when the tunable parameter α lies in a range from 0 to 2. WCS not only provides a method for enhancing network capacity, but also may be applied for suppressing the spread of malicious information in the network.

Keywords: Community Structure, Social Networks; Link Importance to Community; Traffic Capacity

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