



CFM: A FITNESS-MODEL-BASED TOPOLOGY CONTROL ALGORITHM FOR WIRELESS SENSOR NETWORKS

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Abstract The main objective of wireless sensor network design is to maximize network lifetime. The network topology, which is the important foundation of upper layer protocols, serves as the supportive groundwork for this goal. We constructed the model of sensor networks, and investigated the property of topology with complex network theory. Three statistical parameters were used to describe the network structure, and then some ideal characteristics were concluded for topology. The characteristics of topology can be achieved by fitness model, so we designed an approximate clustering algorithm based on fitness model, which is distributed. CFM is composed of three phases: links generation phase, heads selection phase and cluster division phase. The performance of CFM algorithm was analyzed through simulation experiments, which indicated a well-constructed topology and effectively prolonged network lifetime.

Index terms: Wireless sensor networks, topology control, fitness model, cluster-heads selection.