An increasing number of wireless communication devices such as notebooks, hand-held devices or tiny sensors has an enormous impact on our daily lives. Devices that are within transmission range are able to spontaneously form wireless communication networks and unpredictably join and leave network partitions. A dynamic wireless network that potentially consists of thousands of devices create new challenges on how to handle the emerging complex communication topologies in order to reliably and efficiently disseminate information throughout the entire network. One possible approach is understanding the structure and function of our own social network, which is capable to spread rumors and news efficiently in spite of its constantly increasing size, to find answers on how to model a wireless communication network to deal with the complexity. Our social network is a highly complex structure that is tied by different types of interdependency, such as histories, interests, trades, neighborhood, and communications. These ties or links are neither randomly nor uniformly distributed and the characteristics of the links vary considerably. Most interestingly for the problem considered in this paper, our social network is built on a certain diversity of links. Granovetter reports on the difference between friends and acquaintances, pointing out that acquaintances are more useful for certain tasks such as finding a job and disseminating news or rumors. Links between acquaintances are called weak ties. He concludes, that strong ties are better for action, weak ties for new information. Transferring these findings on modeling an efficient wireless communication network, strongly connected devices—i.e. clusters—should concentrate on processing information whereby weak ties should be dedicated mostly on information dissemination in order to reach efficiency. Models for community-like structures that exhibit weak ties have been proposed in the literature. However, most of these models focus on network evolution, therefore the model needs convergence time to establish the final topology. However, wireless communication networks like ad hoc and sensor networks are modeled as geometric random network where the links between nodes depend on the radio transmission range and evolutionary approaches are not suitable since the network constantly
change and maintains the characteristics of a geometric random networks. Furthermore, the initial network topology corresponds to the definition of a unit disk graph and introduction of additional spatial links is not feasible. In this paper we present an algorithm that works locally and fully distributed and does not require convergence time for exhibiting a community-like structure and weak ties a geometric random network. To overcome the restriction of not being able to add links to the network topology, we focused on the clustering coefficient. The clustering coefficient expresses the probability that two neighbors of a node are neighbors themselves. The definition of the clustering coefficient might induce that more links in each nodes neighborhood result in a higher clustering coefficient. Our approach, however, is based on the observation that even the removal of dedicated links can increase the global clustering coefficient. As results we show that increasing of the local clustering coefficients by removing dedicated links promotes the emergence of weak ties in a network.