

**ADAPTIVE TOPOLOGY CONTROL USING VIRTUAL
FORCES IN A DISTRIBUTED MOBILE SENSOR
NETWORK**

By

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ABSTRACT

This work presents a simple, fully distributed algorithm for adaptive topology control in a mobile sensor network. Radio packet loss is treated as an attractor which generates “virtual forces” causing mobile service nodes to move toward locations that improve poor quality radio links. The algorithm automatically gives preference to links along which a greater amount of traffic is directed. Because no explicit radio model is assumed, this algorithm is not hampered by asymmetric transmission or reception sensitivity or multi-path effects and can be applied to heterogeneous networks. Unlike previous connectivity repair algorithms, the service nodes here differ from other nodes in the network only in their task. We test the algorithm through a series of simulations and physical experiments. Connectivity improvements of 50% are achieved out-performing previous topology repair algorithms.