Abstract

Wireless Sensor Networks (WSNs) consist of small power-constrained nodes with sensing, computation and wireless communication capabilities. These nodes are deployed in the sensing region to monitor especial events such as temperature, pollution, etc. They transmit their sensed data to the sink in a multi-hop manner. The sink is the interface between sensor nodes and the end-user. It is responsible for integrating the received data from sensors and delivered the requested data to the user. Node deployment is an important issue in WSNs and can be random or deterministic. A proper node placement can increase connectivity, coverage and lifetime of a WSN. In this paper a novel deployment is proposed in which nodes are placed on two Archimedean spirals that are nested (Nested Spirals). This pattern is five-coverage and five-connected. Analytical results show that our proposed pattern uses fewer nodes than other models such as triangle, square and hexagon. Simulation results also show that our model consumes less energy than other models, so its lifetime and fault tolerance is also higher than regular patterns.
Suitable Node Deployment based on Geometric Patterns Considering Fault Tolerance in Wireless Sensor Networks

- http://mathworld.wolfram.com/ArchimedesSpiral.html
- http://www.mathematische-basteleien.de/spiral.htm
Keywords

Node Deployment  Placement  Spiral  Coverage  Connectivity  Energy  Consumption  Lifetime

Wireless Sensor Network