



## **COVERAGE AND CONNECTIVITY PROBLEMS UNDER BORDER EFFECTS IN WIRELESS SENSOR NETWORKS**

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**ABSTRACT**—Wireless sensor networks can be used to monitor the interested region by multi-hop communication. Coverage is a primary metric to evaluate the capacity of monitoring. In this paper, we focus on the coverage issue under border effects, where the sensor nodes are distributed in a circle-shaped region randomly. Under this scenario, the expected coverage of the sensor node and the total network coverage provided by  $n$  sensor nodes are derived accurately by probability. These findings are useful to determine the related parameters (i.e., sensing range, number of sensor nodes and radius of monitored region) for a specific network coverage ratio. Besides, to guarantee the collected data to be arrived at the sink node, the lower bound of network connectivity probability is also calculated when border effects are considered. Simulation results demonstrate that our analysis is correct and effective.