

## **54. GEOGRAPHIC ROUTING IN DUTY-CYCLED MOBILE SENSOR NETWORKS USING SLEEP SCHEDULING ALGORITHMS**

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Recently, the research focus on geographic routing, a promising routing scheme in wireless sensor networks (WSNs), is shifting toward duty-cycled WSNs in which sensors are sleep scheduled to reduce energy consumption. However, except the connected-k neighborhood (CKN) sleep scheduling algorithm and the geographic routing oriented sleep scheduling (GSS) algorithm, nearly all research work about geographic routing in duty-cycled WSNs has focused on the geographic forwarding mechanism; further, most of the existing work has ignored the fact that sensors can be mobile. In this paper, we focus on sleep scheduling for geographic routing in duty-cycled WSNs with mobile sensors and propose two geographic-distance-based connected- k neighborhood (GCKN) sleep scheduling algorithms. The first one is the geographic-distance-based connected- k neighborhood for first path (GCKNF) sleep scheduling algorithm. The second one is the geographic-distance-based connected- k neighborhood for all paths (GCKNA) sleep scheduling algorithm. By theoretical analysis and simulations, we show that when there are mobile sensors, geographic routing can achieve much shorter average lengths for the first transmission path explored in WSNs employing GCKNF sleep scheduling and all transmission paths searched in WSNs employing GCKNA sleep scheduling compared with those in WSNs employing CKN and GSS sleep scheduling.

Index Terms— geographic-distance-based connected- k neighborhood (GCKN)duty-cycle, geographic routing, mobility, wireless sensor networks (WSNs).

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