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基于空间唤醒的水声传感器网络节能路由协议

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Energy-efficient Routing Protocol Based on Spatial Wakeup for Underwater Acoustic Sensor Networks

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摘要 针对水声传感器网络高能耗的特点，该文提出了基于空间唤醒的节能路由协议ERBSW (Energy-efficient Routing protocol Based on Spatial Wakeup)，该协议将3维网络空间划分为唤醒层和睡眠层，每个节点根据当前的深度信息，动态地决定其处于唤醒或睡眠状态。另外，ERBSW通过定期地广播Hello包来建立唤醒邻节点集合，使得数据包由较高的唤醒层节点向较低的唤醒层节点传递，从而避免了冗余节点因空闲侦听以及不必要的数据接收所产生的能量浪费。仿真结果表明，在不同网络密度条件下，该协议相比VBF(Vector-Based Forwarding)能耗节省了约16%~48%。

关键词： 水声网络 空间唤醒 路由协议 能量有效

Abstract： Considering the characteristic of high energy consumption in underwater acoustic sensor networks, an Energy-efficient Routing protocol Based on Spatial Wakeup (ERBSW) is presented. It divides three dimensional network space into wakeup layers and sleep layers, each node makes local decision on whether to wake up or to sleep according to its current depth. In addition, ERBSW gets wakeup neighbor sets by broadcasting Hello packets periodically, and delivers data from nodes in higher wakeup layer to nodes in lower wakeup layer, which avoids energy consumption caused by idle listening and unnecessary data reception of redundant nodes. Compared with the Vector-Based Forwarding (VBF) protocol, simulation tests show that the proposed protocol can save energy cost by about 16%~48% in various network density.

Keywords： Underwater acoustic networks Spatial wakeup Routing protocol Energy-efficient

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