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一种用于格型拓扑的水声传感器网络TDMA协议

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A TDMA Protocol for Underwater Acoustic Sensor Networks with Grid Topolog

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摘要 由于海洋信道恶劣的传输条件，使设计可靠且有效的水声传感器网络MAC协议面临极大的挑战。该文针对六角格型网络的结构特点提出了G-TDMA协议，该协议通过对时隙的空间复用，提高了信道资源的利用率；并且在数据帧的发送过程中完成网络节点间的同步，从而降低同步开销；同时根据水声信道的高传输延时和起伏特性，加入了保护时间以避免数据冲突。仿真结果表明，在水声信道条件下该协议可有效地改善网络性能。

关键词： 水声传感器网络 格型拓扑 MAC协议 时分复用

Abstract： Challenges of designing reliable and efficient Medium Access Control (MAC) protocols are posed for underwater acoustic sensor networks, because of hostile seawater channel condition. For hexagonal grid topology networks, this paper presents G-TDMA protocol, which improves channel utility with spatial reuse of time slots and reduces synchronic overhead by synchronizing nodes in the process of packet transmissions. In addition, G-TDMA employs guard time to avoid packet collisions due to long propagation delay and channel fluctuations. Simulation tests show that the protocol improves network performances in underwater environment.

Keywords： Underwater acoustic sensor networks Grid topology MAC protocol TDMA

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引用本文：

钟永信; 黄建国; 韩 晶.一种用于格型拓扑的水声传感器网络TDMA协议[J] 电子与信息学报, 2010,V32(7): 1774-1778

Zhong Yong-xin; Huang Jian-guo; Han Jing.A TDMA Protocol for Underwater Acoustic Sensor Networks with Grid Topolog[J] , 2010,V32(7): 1774-1778

链接本文：

http://jeit.ie.ac.cn/CN/10.3724/SP.J.1146.2009.00980   或   http://jeit.ie.ac.cn/CN/Y2010/V32/I7/1774