

## 水下传感网基于深度信息的定向路由协议

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**摘要:** 为了降低水下传感器网络通信过程中端到端时延, 提高发送成功率, 平衡节点能耗, 延长网络生存时间, 在水下传感网基于深度信息的路由协议 (Depth Based Routing, DBR) 的基础上, 提出了基于深度信息的定向路由协议 (Depth Based Directional Routing, DBDR). 新算法以源节点与目的节点间线段为轴线建立半径为  $w$  的虚拟管道, 只有管道内节点才有转发数据资格, 管道内节点以基于深度信息的路由协议发送数据包, 并提出了新的以节点深度和能量为权重的转发时延算法. 基于 NS2 的仿真表明, 与 DBR 相比较, DBDR 协议的端到端时延减少了 23%~42% 左右, 数据包发送成功率达到 95% 以上, 实验结果表明, DBDR 可以更好地平衡网络中节点能耗, 延长网络生存时间, 提高数据包传递成功率, 降低了数据包通信时延.

**关键词:** 水下三维传感网; 深度信息; 定向路由; 节点能耗; 数据包发送率; 端到端时延

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## Depth Based Directional Routing Protocol in Underwater Sensor Networks

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**Abstract:** In order to reduce the end to end packet delay and increase the packet delivery ratio in the Underwater Sensor Network (UWSN), balancing the energy consume of nodes, and extending the network lifetime, a new Depth Based Directional Routing (DBDR) protocol based on the Depth Based Routing (DBR) was proposed. The new protocol sets up a virtual routing pipe with radius  $w$ , and its axis is the line between the source node and target node. Only the nodes in the pipe are allowed to forward packets, and the nodes forward packets in the depth based routing protocol. Also, DBDR proposes a forward delay algorithm, sets the depth and rest energy as weight factors. In the comparison experiments with DBR on the NS2, the end to end packet delay of DBDR protocol decreased about 23%~42%, the packet delivery ratio reached to more than 95%. The results show that the protocol not only can better balance the energy consume of nodes and prolong the survival time of the whole network, but also achieve very high packet delivery ratios and much lower end to end delay.

**Key words:** under water sensor network (UWSN); depth information; directional routing; node energy consume; packets delivery ratio; end to end delay

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