水下舰艇通信网络中的故障数据挖掘方法仿真

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摘　要：在水下通信中，海洋混响将对舰艇通信网络产生破坏性干扰，导致通信网络故障和通信信道失衡，传统方法采用相邻数据段匹配滤波方法进行故障数据挖掘，识别性能不好．对提出基于分段预白化匹配检测的水下舰艇通信网络中的故障数据挖掘算法．构建了水下通信信道模型，通过分段预白化处理，把故障数据信号解析模型分解为多个窄带信号，对故障数据进行匹配检测，求得通信网络中的干扰特征幅度和相位信息，用 AR 模型估计不同时刻的混响频谱，对当前数据段进行平滑处理，对每段故障数据型进行分段匹配滤波检测，对当前数据段的处理结果与前一数据段的处理结果进行分段预白化匹配相关检测，实现故障数据有效识别．仿真结果表明，采用该算法能有效提高故障数据准确识别率，通过合理配置分段预白化匹配参数，提高水下舰艇通信网络中的故障数据的准确检测概率，改善了舰艇对潜水下通信的质量．

关键词：海洋混响；舰艇；通信网络；故障数据挖掘

Simulation of Fault Data Recognition Method in Underwater Ship Communication Network

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Abstract: The ocean reverberation has time variability and non stationary. The sea reverberation will have a destructive interference to the underwater communication network. Communication network fault and communication channel imbalance, the need for the underwater ship communication network fault data for effective identification, and improve the stability and reliability of the submarine communication. In the traditional method, the fault data is identified by using the matched filtering method. The performance is not good with the nonlinear variation of the ocean reverberation. A new method of fault data recognition based on sub - pre whitening matching detection of underwater ship communication network is proposed. The model of underwater ship communication network model and communication channel model is built. The fault data signal is decomposed into multiple narrowband signals. The signal is detected by using AR model. The results are compared with the data of different time. The method is used to detect the different time of the data. Simulation results show that the proposed algorithm can effectively improve the accuracy of fault data, and can improve the accuracy of the fault data in the communication network, and improve the quality of the underwater communication.

Key words: Ocean reverberation; ship; communication network; fault data recognition

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