

## The Design of Multiple Detection Parallel Combined Spread Spectrum Communication System

**Authors :** Lixin Tian, Wei Xue

**Abstract :** Many jobs in society go underground, such as mine mining, tunnel construction and subways, which are vital to the development of society. Once accidents occur in these places, the interruption of traditional wired communication is not conducive to the development of rescue work. In order to realize the positioning, early warning and command functions of underground personnel and improve rescue efficiency, it is necessary to develop and design an emergency ground communication system. It is easy to be subjected to narrowband interference when performing conventional underground communication. Spreading communication can be used for this problem. However, general spread spectrum methods such as direct spread communication are inefficient, so it is proposed to use parallel combined spread spectrum (PCSS) communication to improve efficiency. The PCSS communication not only has the anti-interference ability and the good concealment of the traditional spread spectrum system, but also has a relatively high frequency band utilization rate and a strong information transmission capability. So, this technology has been widely used in practice. This paper presents a PCSS communication model-multiple detection parallel combined spread spectrum (MDPCSS) communication system. In this paper, the principle of MDPCSS communication system is described, that is, the sequence at the transmitting end is processed in blocks and cyclically shifted to facilitate multiple detection at the receiving end. The block diagrams of the transmitter and receiver of the MDPCSS communication system are introduced. At the same time, the calculation formula of the system bit error rate (BER) is introduced, and the simulation and analysis of the BER of the system are completed. By comparing with the common parallel PCSS communication, we can draw a conclusion that it is indeed possible to reduce the BER and improve the system performance. Furthermore, the influence of different pseudo-code lengths selected on the system BER is simulated and analyzed, and the conclusion is that the larger the pseudo-code length is, the smaller the system error rate is.

**Keywords :** cyclic shift, multiple detection, parallel combined spread spectrum, PN code

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