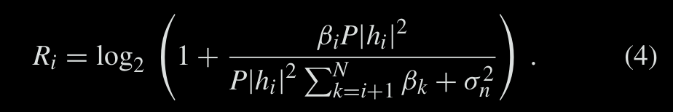
A Novel Inter-Decoding Algorithm in Superposition Coding Cooperative Network in IoT

Idea

Conventional Superposition modulation scheme : Relay에서 decoding에 성공하는 경우, Power ratio를 조절하여 전송하는 방식

New decoding scheme : Superposition coding을 사용하지만 SIC없이 Source와 Relay node의 information을 각각 decoding하는 것

Abstract

We propose a new decoding strategy for cooperative network based on superposition modulation. The new decoding scheme can outperform conventional cooperative diversity base on DF by about ‘~~~’dB in the SNR rage of interest.

1. Introduction

Recently, as IoT is applied to various fields, there is a need for research on high reliability communication systems. Several alternatives have been developed to overcome fading in wireless communication environments. In the IoT communication system, it is difficult to install a plurality of antennas in order to obtain a diversity effect in a low-cost small device. Therefore, a space diversity effect is obtained by applying a cooperative communication technique. In this paper, we propose a decoding algorithm without SIC in cooperative communication method using superposition modulation. This solves the bottleneck of the existing superposition modulation scheme.

1. related work //related work 기술하는 방법 다시 살펴보기

To the best of our knowledge, various algorithms have been developed for cooperative communication techniques. There is a method in which a relay node decides whether to receive (AF) (Amplify and Forward) or DF (Decode and Forward) a packet of a source node and retransmits the packet of the source node. [1] At this time, a method of lowering the BER by setting an optimal threshold value of the signal noise noise value has also been proposed. [2] [4] Also, when using multiple relay nodes, a relay node selection algorithm with the best channel state based on signal noise noise has also been introduced [5]

1. System model

In this paper, we consider a system consisting of one source node (S), one relay node (R), and one destination (D) as shown in Fig.1 All nodes assume a single antenna. The complex channel coefficients between nodes are denoted by, ,  and channel coefficients are random variables having a complex Gaussian distribution with an average of 0 and a variance per dimension of 0.5. Also , ,  and are the complex white Gaussian noises with an average of 0 and a variance per dimension. Represents the information of the source node, and the information of the relay node.

1. algorithm

Fig. 1

1st phase : The source node transmits a packet including its own information. R (Relay node) and D (Destination).

2nd phase : If decoding fails, D sends a NACK to request retransmission. At this time, R retransmits power by superposing power on. The received retransmission signal is as follows.







Bit level combining..

Source와 relay bit llr구하는 방법에 대해서 수식으로 표현

1. Simulation

Turbo code log MAP방식으로 LLR generation, iteration 8, EGC(Equal Gain Combining)

1. Conclusion

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