On the Performance of Spatial Modulation MIMO for Full-Duplex Relay Networks
ABSTRACT

- In this paper, we investigate, for the first time, the performance of a full-duplex (FD) relaying protocol, where a single-RF Spatial Modulation (SM) Multiple-Input Multiple-Output (MIMO) system is employed at the relay node. We refer to this protocol as SM-aided FD relaying (SM-FDR).

- At the destination, a demodulator that takes advantage of the direct connectivity between the source and destination is developed in order to maximize its performance. Based on this demodulator, we introduce a mathematical framework for computing the average error-probability of SM-FDR in the presence of residual Self-Interference (SI).
Furthermore, we derive mathematical expressions for computing the achievable rate of SM-FDR. With the aid of these achievable rate expressions, we provide an estimate on the quality of SI cancellation required for the suitability of FD transmission.

In addition, we develop and evaluate three relay selection policies specifically designed for the SM-FDR protocol. The mathematical analysis is substantiated with the aid of extensive Monte Carlo simulations. Finally, we also assess the performance of SM-FDR against traditional FD relaying protocols.
EXISTING SYSTEM

- The most popular relaying protocols available in the literature are amplify-and-forward (AF) and decode-and-forward (DF) relaying.
- In spite of their many advantages, one of the fundamental challenges of these relaying protocols is their requirement for extra bandwidth resources due to the half-duplex (HD) constraint of the relay, i.e., the relay cannot transmit and receive on the same frequency at the same time. This might result in a loss of system throughput.
PROPOSED SYSTEM

- An FD relaying system is considered, where the multi-antenna source uses transmit beamforming to forward its data to the relay, and the relay uses SM to forward the data to the destination.

- However, the effects of SI and the direct link have not been taken into consideration. Against this background, in the present paper, we investigate the performance of a new SM transmission protocol for FD relay networks, and throughout this paper, it is referred to as SM-aided FD relaying (SM-FDR).

- In simple terms, SM-FDR utilizes a single multi-antenna FD relay to decode, and then forward to the destination using SM, the data symbol transmitted from the source, while simultaneously receiving the source’s next transmitted symbol.
HARDWARE REQUIREMENTS

- Processor: Pentium-IV
- Speed: 1.1 Ghz
- RAM: 256MB (min)
- Hard Disk: 20 GB
- Key Board: Standard Windows Keyboard
- Mouse: Two or Three Button Mouse
- Monitor: SVGA
SOFTWARE REQUIREMENTS

- Tool: Network Simulator-2
- Operating system: LINUX
- Front end: OTCL (Object Oriented Tool Command Language)
REFERENCES

