Relay Selection for Coded Cooperative Networks over Nakagami-\(m\) Fading Channels

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**ABSTRACT**

A relay selection for turbo coded cooperative networks subject to Nakagami-\(m\) fading is considered in this paper. It is assumed that the channel state information (may not be ideal) is known at the receiver. Further, feedback delay caused by the difference between the instantaneous channel state information during the transmission and the channel state information at the time of relay selection, resulting in outdated channel state information phenomena. The impact of the outdated channel state information on the proposed scheme is investigated in this paper. A closed-form expression for the outage probability is derived and its asymptotic expression in the high signal-to-noise (SNR) regime is studied. Further, upper bounds on the bit-error rate (BER) are presented. Study of the diversity order reveals that for ideal channel state information, full diversity in the number of relays and fading parameters \(m\) is achieved as opposed to outdated channel state information where the achievable diversity is equivalent to the diversity of a coded cooperative network with a single relay.

**Keywords:** Coded cooperation, diversity order, error rate, relay selection, turbo codes.