PERFORMANCE ANALYSIS OF LAND MOBILE SATELLITE (LMS)
BASED MIMO RELAY COMMUNICATION

Abstract

In terrestrial wireless network, relay assisted cooperative communication has received tremendous attention as a means to improve transmission reliability through diversity and to extend coverage without large transmit power requirement. Performance and throughput gain of multiple input multiple output (MIMO) systems are well known. When MIMO is feasible, an obvious attempt would be augmenting the classical relay channels with multiple antennas that reap the benefits of both MIMO and cooperative relays. MIMO relaying technology is a new paradigm with tremendous potential that has already been proposed as a next major extension of IEEE 802.16 Worldwide Interoperability for Microwave Access (WiMAX) standard. Future satellite communication should not be immune to such innovative development trends of terrestrial communication. Adaption of such trends of terrestrial communication, relaying and cooperation with MIMO technology, to satellite communication via terrestrial relay nodes forming Hybrid Satellite/Terrestrial Network is investigated in this research.

Advanced radio link technologies like MIMO, orthogonal space time block coding (OFDM) and advanced error control codes enhance link throughput but yet cannot bring satellite coverage indoor. Relaying via terrestrial relay nodes not only solves such coverage issues but also can serve low cost user terminals with no satellite transmission/reception capabilities. Cooperative satellite communication via terrestrial relay nodes serves a power diversity technique in mitigating blockage effects in land mobile satellite (LMS) communication. In the view of such inherent benefits of relaying in satellite communication, dual hop MIMO relay systems based on beamforming and orthogonal space time block coding (OSTBC) are proposed in this thesis along with their comprehensive performance analyses.

LIST OF PUBLICATIONS

Conference Publication

Yamuna Dhungana and Nandana Rajatheva, “Analysis of LMS based dual hop MIMO systems with beamforming,” in Proc. IEEE Int. Conf. on Commun. (ICC2011), accepted for publication.

Journal Publications