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Abstract

Engineering and the Built Environment
School of Electrical and Information Engineering

Master of Science

Comparison of Code Rate and Transmit Diversity in MIMO Systems

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In order to compare low rate error correcting codes to MIMO schemes with transmit diversity, two systems with the same throughput are compared. A VBLAST MIMO system with $(15, 5)$ Reed-Solomon coding is compared to an Alamouti MIMO system with $(15, 10)$ Reed-Solomon coding. The latter is found to perform significantly better, indicating that transmit diversity is a more effective technique for minimising errors than reducing the code rate. The Guruswami-Sudan/Koetter-Vardy soft decision decoding algorithm was implemented to allow decoding beyond the conventional error correcting bound of RS codes and VBLAST was adapted to provide reliability information. Analysis is also performed to find the optimal code rate when using various MIMO systems.