

1. Title: Efficient MIMO systems with full diversity

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Key words: MIMO communication, Deterministic processing

Domain: Communication

Summary: The technology is developed for a single spatial stream-based MIMO system for improving the quality of reception. This technology relates to a MIMO communication system where the transmitter and receiver utilize deterministic weights for achieving full diversity over flat Ricean fading channels. A deterministic weight-based scheme is proposed which combines deterministic transmit beamforming and deterministic receive combining in correlated Ricean fading MIMO channels. The optimized weights are obtained from the knowledge of the channel statistics and exact CSI is not required for their computation. Deterministic beamforming can utilize beamforming weights that remain constant, e.g., to improve performance where the design of the antennas in the transmitter or receiver results in a fixed component of the channel correlation. This method removes the requirement of perfect knowledge of channel gains for decoding the data belonging to a practical constellation and also avoids the requirement of knowledge of instantaneous channel values at the transmitter and receiver. It also minimizes the union bound on symbol error probability.

Advantages:

- » Improved quality of reception
- » Very useful for diversity and array gain
- » High data rates in wireless systems
- » Full diversity over Ricean fading channel

Applications:

Easily implemented in software stored on computer readable medium.

Easily implemented within ASICs, DSPs, FPGAs, other electronic units designed to perform the function

Efficiently provides accurate processing in wireless, MIMO system.

Scale of Development: A functional prototype system is developed, tested and demonstrated in Laboratory environment, and proof of concept is demonstrated.

Technology Readiness Level: 4

IP Status: Granted US Patent 9553647