EE359 – Wireless Communications
Term Project – Autumn 2003

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Proposal

This project will consist of reviewing several proposed signal processing techniques aiming the particular wireless channel configuration where the transmitter has multiple antennas and the receiver one single antenna. This is in fact the case of macro-cell forward-link channel used by a basestation serving multiple users as applicable to the emerging WiMax applications based on IEEE standard 802.16a.

As claimed by the respective authors, the achieved diversity gain would be very close to that as if same number of multiple receiver antennas had had been used. Also, the scheme would easily be generalized to increase the diversity gain linearly using more receive antennas. Besides, no bandwidth expansion was necessary, namely for information feedback to transmitter, and complexity was similar to MRRC.

The report will be based mainly on the references [Ala98] and [Win98]. The article [Pau97] will be used in complement to the class materials for theoretical background and/or further clarifications.

References

[Ala98] Siavash M. Alamouti, "A Simple Transmit Diversity Technique for Wireless Communications," *IEEE Journal on Select Areas in communications*, Oct 1998, vol. 16, no. 8, pp. 1451-58.

[Pau97] Arogyaswami J. Paulraj, Constantinos B. Papadias, "Space-Time Processing for Wireless Communications," *IEEE Signal Processing Magazine*, Nov 1997, vol. 14, pp. 49-83.

[Win98] Jack H. Winters, "The Diversity Gain of Transmit Diversity in Wireless Systems with Rayleigh Fading," *IEEE Transaction on Vehicular Technology*, Feb 1998, vol. 47, pp. 119-23.