EE4-65/EE9-SO27 Wireless Communications
Coursework 1: Link-level Performance Evaluation of SISO/SIMO/MISO

Bruno Clerckx
Communications and Signal Processing Group
Department of Electrical and Electronic Engineering
Imperial College London
email: b.clerckx@imperial.ac.uk

January 10, 2019

1 Objective

Evaluate the error rate performance (link-level evaluations) of basic SISO/SIMO/MISO transmission and reception schemes using Matlab.

2 Tasks

The following tasks should be performed:

1. For SNR ranging from 0dB till 20dB, simulate using Matlab the bit error rate vs SNR performance of

   - Uncoded QPSK transmission over a SISO Rayleigh fading channel.
   - Uncoded QPSK transmission over a SIMO i.i.d. Rayleigh fading channel with MRC combining and two receive antennas.
   - Uncoded QPSK transmission over a MISO i.i.d. Rayleigh fading channel with MRT (Matched Beamforming) and two transmit antennas.
   - Alamouti scheme with QPSK over a MISO i.i.d. Rayleigh fading channel two transmit antennas.

   Explain the observed results and the achieved diversity and array gains.

3 Deliverables

The project is conducted **individually** using Matlab. All Matlab files must have been written by yourself. Each student is requested to submit (on Blackboard)

1. A pdf **report** detailing the results. Format: Font size 10 pt, maximum 5 pages, single-spacing. In your report, you should write the system model and explain the observed results and the achieved diversity and array gains. You should also contrast the simulation results with the theoretical results, and clarify whether your simulation results are inline with the theory. You should explain the rationale behind all the observations made.

2. **All Matlab files** with comments. The files should be self-explanatory and the examiner should be able to run the code and get the same results as those provided in the report. Explain how to run the code.

Deadline for report submission on Blackboard: **3 February 2019, 12:00 midnight** (London time).