Department of Electronics and Electrical Engineering
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Lab Sheet 5

EE333: Communication and DSP Laboratory February 16, 2021

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1) Generate a random matrix that has more columns than rows (fat-matrix) and Gram Schmidt orthogonalization on it, to generate an orthonormal matrix, and a representation of the original matrix with the newly generated orthonormal matrix as a basis.
2) Generate a stream of 96 random bits and transmit it at a bit rate of 5 mbps (million bits per second) over a carrier frequency 50 MHz, and sampled at 500 MHz, examine the signal waveforms for
   - BPSK
   - QPSK
   - 8-PSK
   - 16-QAM
   - 64-QAM.
3) Try to retrieve the transmitted bits from the modulated waveforms using a correlation receiver, since there is no additive noise, there should be no errors. Note that this is pass-band processing of the digital modulated signals, and hence is cumbersome. We will discuss the base-band processing of digitally modulated signals in the next lab session.