**University of Moratuwa**

**Faculty of Engineering**

**Department of Electronic & Telecommunication Engineering**

**EN3052 Communications Systems II**

B.Sc. Eng., 2012 Batch Semester 5, May 2015

**Mini Project**

This mini project is based on your very own 8-point signal constellation. You will find this on the course site on LearnOrg, identified by your group number. The reference constellation for comparison is given below on this page.

Develop a Matlab program to map a stream of random binary data onto the given symbols and add white Gaussian noise. Use *Gray coding* for the mapping. Parameter *A* of the constellation and the noise power *N* should be variable. Your program should be easily adaptable to a different 8-point constellation.

Find the average symbol energy *Es* for a given value of *A*, and compare with the reference constellation.

Find the minimum distance between signals and compare with the reference constellation for a given value of *A*.

Show the effect of noise on a signal space diagram for different values of *Es*/*N*.

Estimate the probability of symbol error for different values of *Es*/*N* by simulating a sufficiently long stream of data. Compare with the probability of symbol error for the reference constellation.

*Evaluation will be based on:*

* A poster presentation of your results



* A mini-test based on the application of your program to a different constellation

**The reference 8-PSK constellation**