 College of Electrical & Mechanical Engineering, NUST

Department of Computer Engineering

**EC-431 Digital Communication**

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**CE-42-A**

Total Marks: 20 Time: 60 min

**Students are required to upload the PDF file containing the MATLAB Source Code and MATLAB Output Figures/Screenshots, on LMS Portal.**

**TASK:**

A modem is a computer hardware device that converts data from a digital format into a format suitable for an analog transmission medium such as telephone or radio. A modem transmits data by modulating one or more carrier wave signals to encode digital information, while the receiver demodulates the signal to recreate the original digital information.

Your goal is to design a modem that translates digital signal into analog signal using 8-PSK modulation technique.

**Code:**

**M = 8;**

**k = log2(M);**

**n = 3000;**

**bitStream = randi([0, 1], n, 1);**

**symbolStream = reshape(bitStream, [], k); % Reshaping with empty rows argument**

**dataSymbolsIn = bi2de(symbolStream);**

**modulatedSignal = pskmod(dataSymbolsIn, M, pi/M);**

**SNR = 20;**

**% Generating received signal with noise**

**receivedSignal = awgn(modulatedSignal, SNR);**

**receivedSymbolsOut = pskdemod(receivedSignal, M, pi/M);**

**receivedBits = de2bi(receivedSymbolsOut, k);**

**receivedSymbolsOut = pskdemod(receivedSignal, M, pi/M);**

**receivedBitStream = receivedBits(:);**

**[numErrors, BER] = biterr(bitStream, receivedBitStream);**

**fprintf('Number of bit errors: %d\n', numErrors);**

**fprintf('Bit Error Rate (BER): %f\n', BER);**

**figure;**

**subplot(2,1,1);**

**plot(real(modulatedSignal), imag(modulatedSignal), 'bo');**

**title('Transmitted 8-PSK Modulated Signal');**

**xlabel('IN-PHASE');**

**ylabel('Quadrature');**

**grid on;**

**subplot(2,1,2);**

**plot(real(receivedSignal), imag(receivedSignal), 'ro');**

**title('Received 8-PSK Modulated Signal');**

**xlabel('IN-PHASE');**

**ylabel('Quadrature');**

**grid on;**

*Late submissions will not be accepted under any circumstances. Any form of academic dishonesty is strictly prohibited. Kindly refrain from using cellphones during the examination and surrender them to the instructor. Access to the internet is not permitted during the assessment.*

***Best of Luck!***



