­BASA: Mission to Mars

# Message from Mars-242 Mission Control

## EGB 242 Signal Analysis

## Liam Andrews – N10528873

# Introduction:

# Appendix:

## MATLAB Grader Code:

### Question 1:

function [sid,S1f] = fourierT(sid)

% Do not alter line below:

syms f

% Enter your student ID as sid:

sid = 10528873;

% As a symbolic expression, save the expressions

% for S1f below:

S1f = 14/(7^2 + 4 \* pi^2 \* f^2)

end

### Question 2:

function [sid,S2f] = fourierT(sid)

% Do not alter line below:

syms f

% Enter your student ID as sid:

sid = 10528873;

% As a symbolic expression, save the expressions

% for S2f below:

S2f = 1/2 \* ((6/(9 + 1j\*2\*pi\*(f-33))) + (6/(9 + 1j\*2\*pi\*(f+33))));

end

### Question 3:

### Question 4:

function [sid,f1,S1f] = fourierT(sid)

% Enter your student ID as sid:

sid = 10528873;

% Define the frequency vector

f1 = linspace(-50, 50, 10000 + 1); f1(end) = [];

% evaluate S1f (do not use fft - use answer from previous questions)

S1f = 14./(7.^2 + 4 .\* pi.^2 .\* f1.^2);

end

### Question 5:

function [sid,t3,s3t,Ts,fs,k3,S3k, mag\_S3k, phase\_S3k] = q6(sid);

% Enter your student ID as sid:

sid= 10528873;

% Generate Time Vector

t3 = linspace(-2, 2, 999 + 1); t3(end) = [];

% Generate signal vector s3(t) in time domain

s3t = (rectangularPulse(-3, 3, t3) + 6.\*exp(-9\*t3).\*heaviside(t3).\*cos(2\*pi\*33\*t3)).\*cos(2\*pi\*33\*t3);

% Determine the sampling period

Ts = t3(2) - t3(1);

% Determine the Sampling Frequency

fs= 1/Ts;

% Generate frequency vector

k3 = linspace(-fs/2, fs/2, 999 + 1); k3(end) = [];

% Perform Discrete Fourier Transform of s3t

S3k= fft(s3t);

% store the magnitude plot as 'mag\_S3k'

figure(1)

mag\_S3k= plot(k3, fftshift(abs(S3k))/fs, 'b');

title('Magnitude of Signal in Frenquency Domain')

xlabel('Frequency')

ylabel('Magnitude')

% store the phase plot as 'phase\_S3k'

figure(2)

phase\_S3k= plot(k3, fftshift(angle(S3k)), 'b');

title('Phase of Signal in Freqency Domain')

xlabel('Frequency')

ylabel('Phase')

end

### Hand Calculations for MATLAB Grader Codes:

Text, letter

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