

## Assignment-2

Due date: 03/10/2019

*Assume suitable values wherever necessary*

Find the Laplace Transforms

1.  $\frac{e^{-t} \sin t}{t}$

2.  $\frac{\sin^2 t}{t^2}$

3.  $\int_0^\infty \frac{e^{-t} \sin t}{t} dt$

4.  $e^{-4t} \int_0^t \frac{\sin 3t}{t} dt$

5. Solve the following equation using method of Laplace Transforms  $\frac{d^2 y}{dt^2} + n^2 y = a \cos(nt + \alpha)$  where  $n$  and  $\alpha$  are constants, under the conditions  $y(0) = \dot{y}(0) = 0$

6.  $\frac{d^2 y}{dt^2} + y(t) = H(t - 1)$ , under the conditions  $y(0) = 0$  and  $\dot{y}(0) = 1$

7. Solve the equation using Laplace Transforms  $\ddot{x} + 4x = f(t)$  where

$$f(t) = \begin{cases} 4t & \text{for } 0 \leq t \leq 1 \\ 4 & \text{for } t > 1 \end{cases}$$

*Plot the solutions and transforms of all the problems (as applicable).*

## Mathematics Assignment 2

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## Problem 1

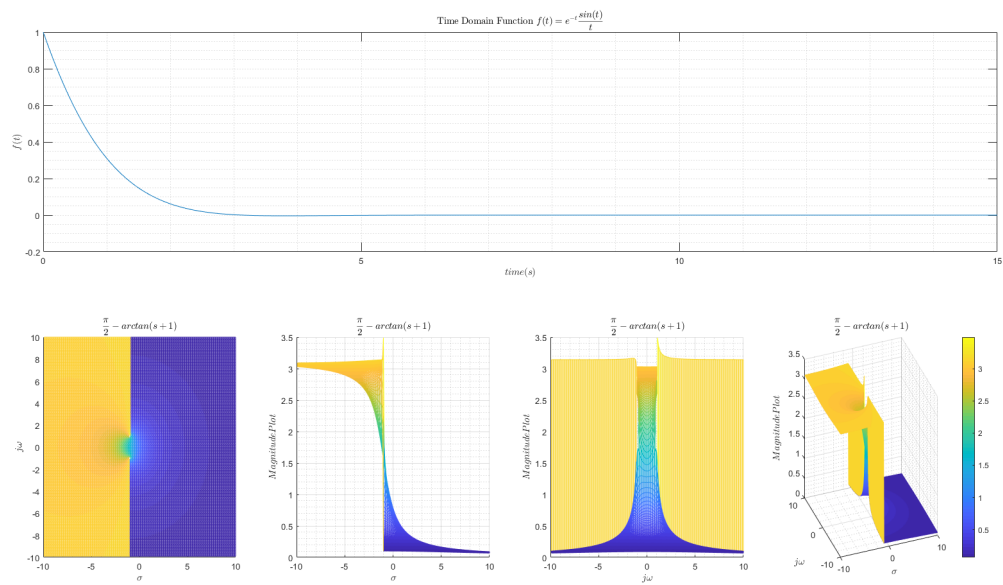


Figure 1: Question 1 Simulation On MATLAB

## Problem 2

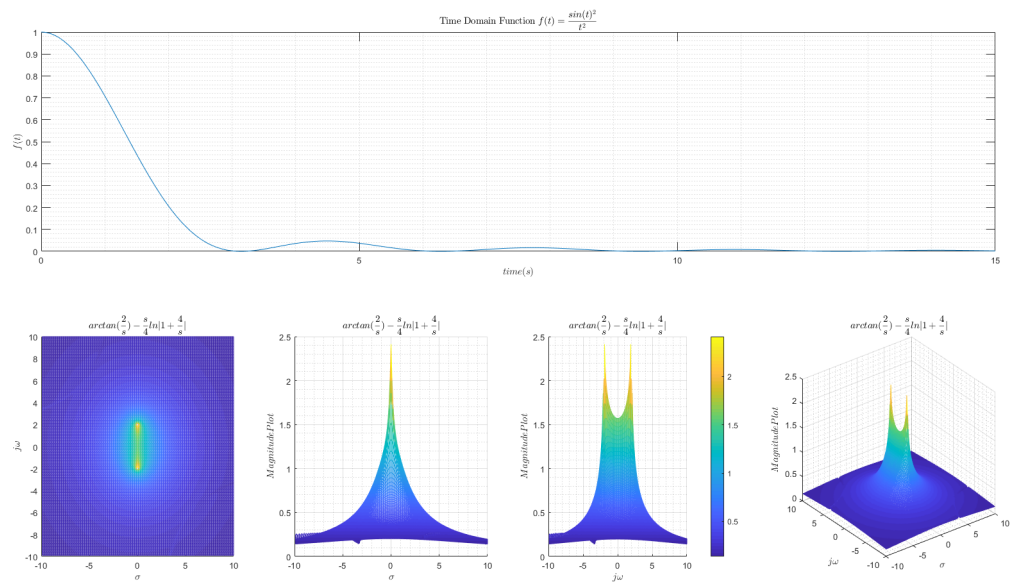


Figure 2: Question 2 Simulation On MATLAB

### Problem 3

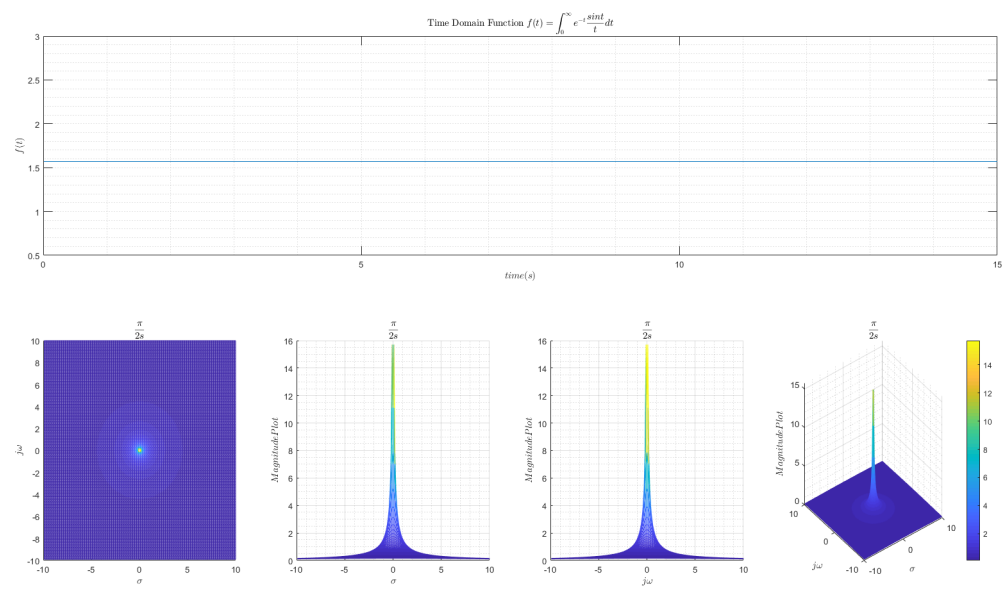


Figure 3: Question 3 Simulation On MATLAB

## Problem 4

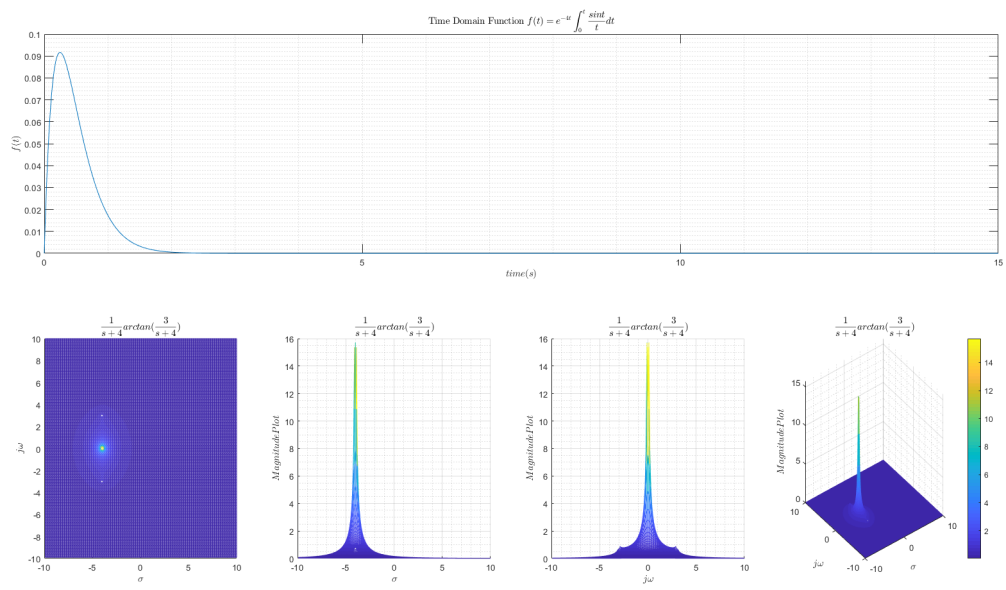


Figure 4: Question 4 Simulation On MATLAB

## Problem 5

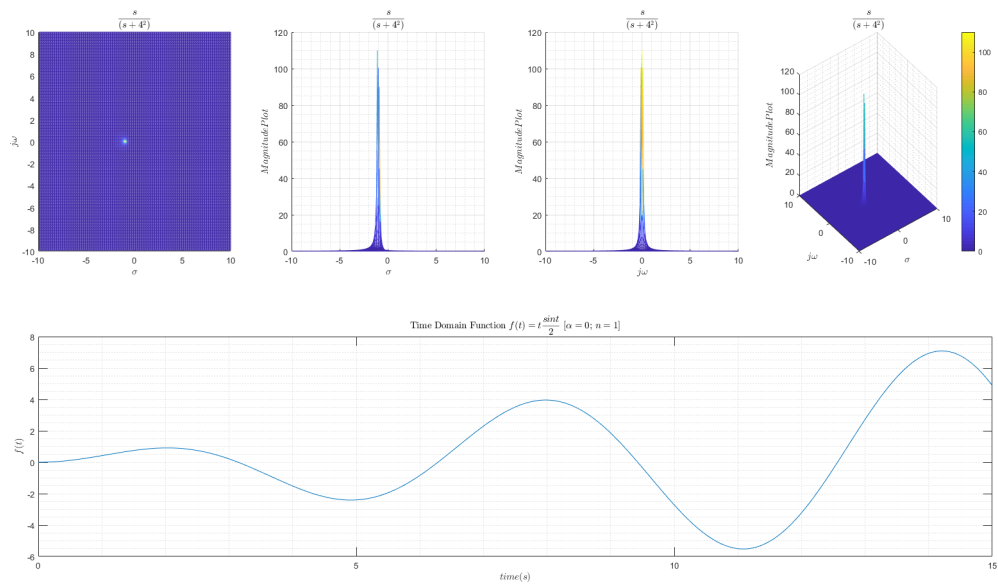


Figure 5: Question 5 Simulation On MATLAB

## Problem 6

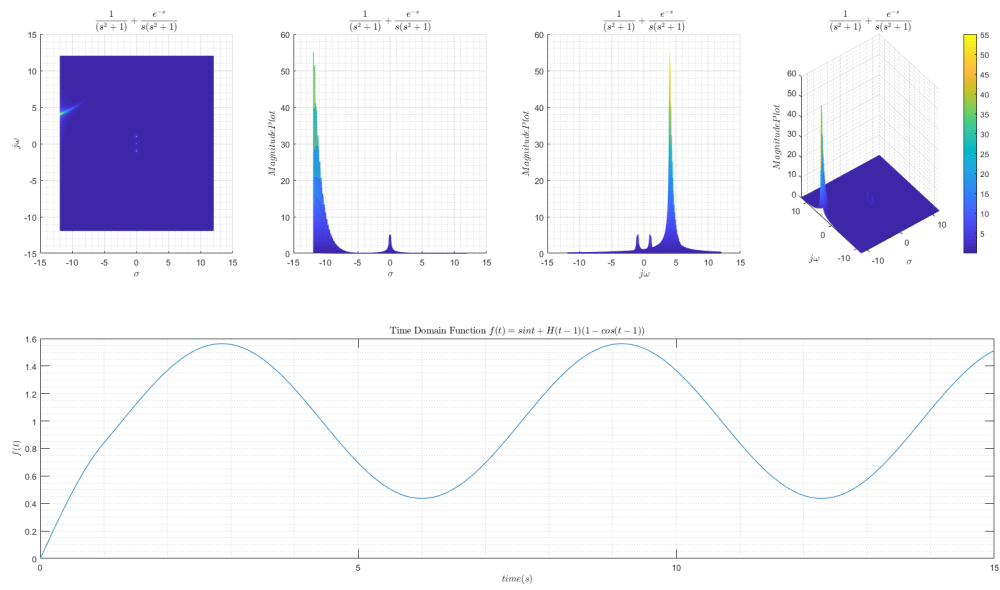


Figure 6: Question 6 Simulation On MATLAB

## Problem 7

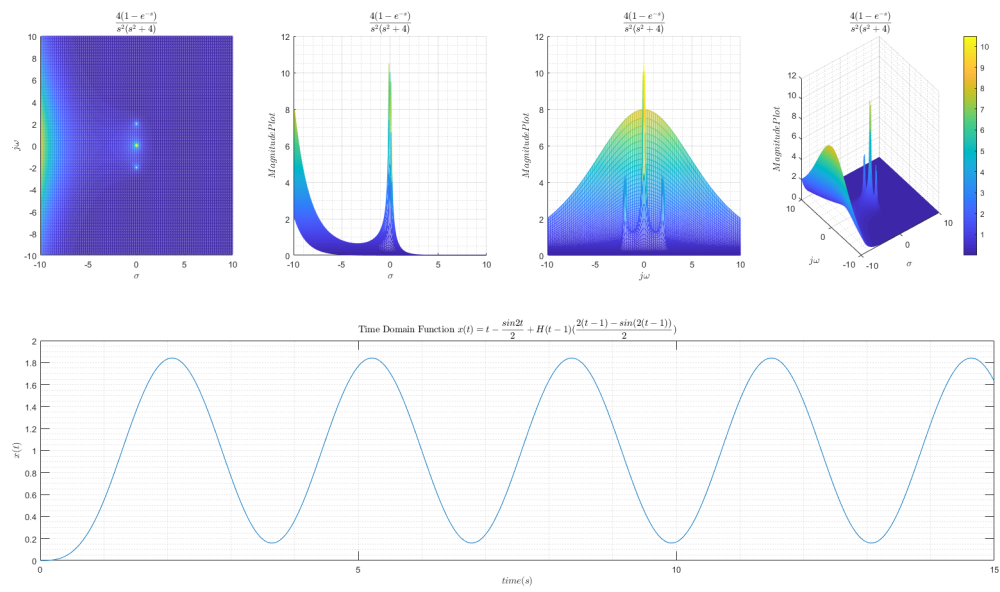


Figure 7: Question 7 Simulation On MATLAB