EEN 307 Homework #4

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- The transfer function for a second-order system is:

$$H(s) = \frac{Y(s)}{X(s)} = \frac{1}{s^2 + b_1 s + b_0}$$

- The input is:

$$x(t) = u(t)$$

Question A: Let the coefficients be: $b_1 = 5$ and $b_0 = 6$. Find the response y(t). Use MATLAB to verify the response and to plot it.

1) Matlab code:

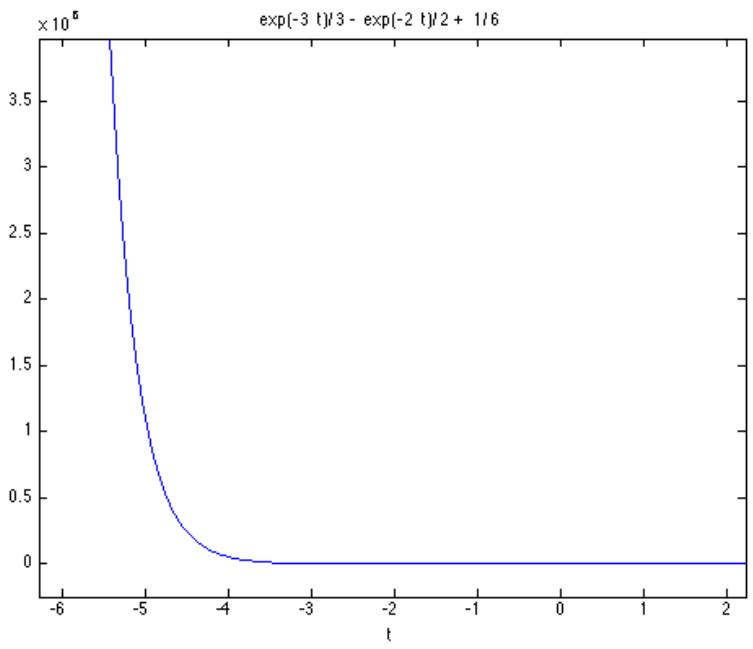
```
syms s t;

%% --- Part a: Finding yt --- %%

b1 = 5;
b0 = 6;
num = 1;
den = s^2 + b1*s + b0;
Hs = num/den;
xt = heaviside(t);
Xs = laplace(xt);
Ys = Xs*Hs;
yt = ilaplace(Ys);

figure(1);
ezplot(yt);
```

2) Pictures



Question B: Let the coefficients be: $b_1 = 2$ and $b_0 = 6$. Find the response y(t). Use MATLAB to verify the response and to plot it.

1) Matlab code:

```
syms s t;

%% --- Part b: New Coefficients --- %%

b1_b = 2;
b0_b = 6;
num_b = 1;
den_b = s^2 + b1_b*s + b0_b;
Hs_b = num_b/den_b;
xt_b = heaviside(t);
Xs_b = laplace(xt_b);
Ys_b = Xs_b*Hs_b;
yt_b = ilaplace(Ys_b);

figure(2);
```

```
ezplot(yt_b);
```

2) Pictures