EEN 307 Homework #3

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Q1: Use MATLAB to compute the inverse Laplace transform of

$$X(s) = \frac{s^2 + 2s + 1}{s(s+1)(s^2 + 10s + 50)}$$

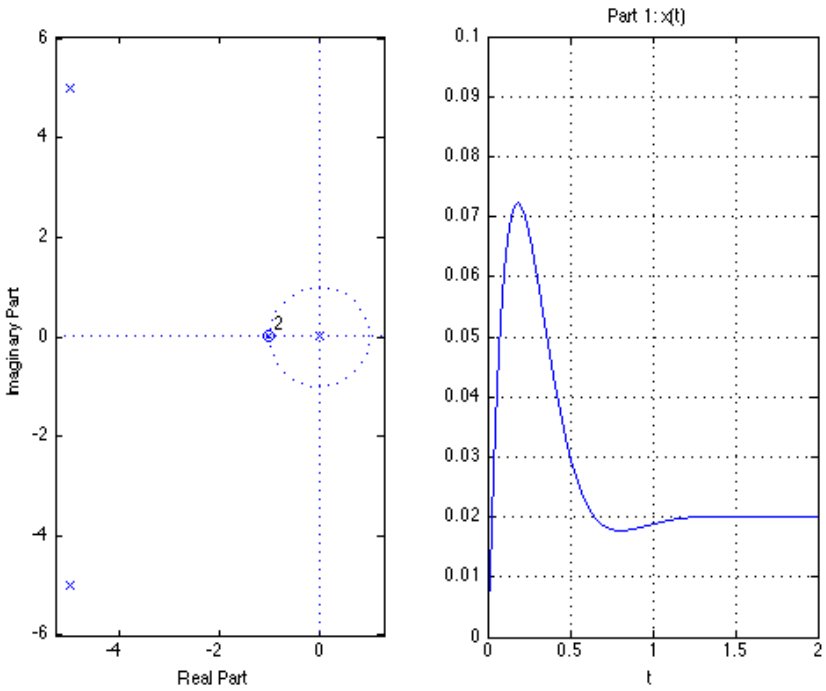
1) Matlab code:

```
syms s
num = s^2+2*s+1;
den = s*(s+1)*(s^2+10*s+50);     % s^4 + 11s^3 + 60s^2 + 50s
Xs = num/den;

num_coeffs = [0 0 1 2 1];
%den_coeffs_0 = conv(s,s+1);
%den_coeffs = conv(den_coeffs_0,s^2+10*s+50);
den_coeffs = [1 11 60 50 0];

figure(1);
subplot(121);
zplane(num_coeffs,den_coeffs);
xt = ilaplace(Xs);
subplot(122);
ezplot(xt,[0 2]);
axis([0 2 0 0.1]);
title('Part 1: x(t)');
grid;
```

2) Pictures



Q2: Find the inverse Laplace transform x(t) (Use MATLAB to verify your result).

$$X(s) = \frac{(1 - se^{-s})}{s(s+2)}$$

1) Matlab code:

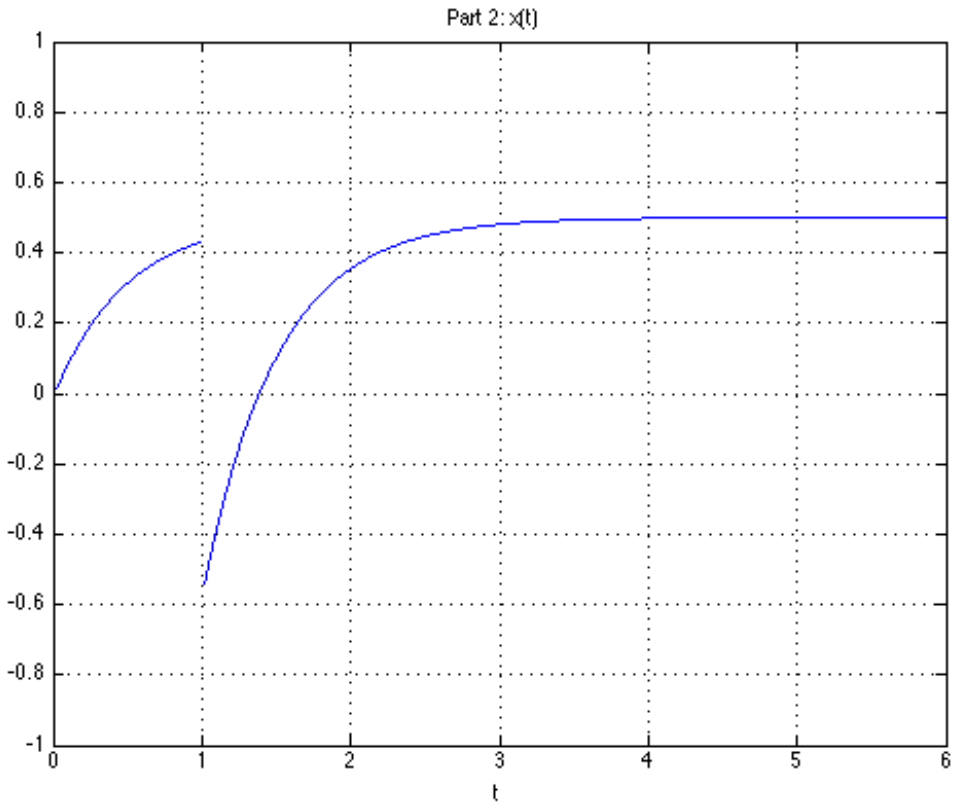
```
clc
clear all

syms s
num = 1-s*exp(-s);
den = s*(s+2);
Xs = num/den;

xt = ilaplace(Xs);
figure(2);
ezplot(xt,[0 6]);
```

```
axis([0 6 -1 1]);
title('Part 2: x(t)');
grid;
```

2) Pictures



3) Proof