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## Eric Jiang - 158002948

LSSLsb 11 - Summer C2 7/10/2017

```
clear; clc; close all;
syms t s
```

### Problem 1

```
L1 = laplace(dirac(t))           % 1
L2 = laplace heaviside(t)        % 1/s
L3 = laplace(cos(2*pi*t)*heaviside(t)) % s/(s^2 + 4*pi^2)
L4 = laplace(exp(-3*t)*heaviside(t)) % 1/(s + 3)
```

$L1 =$

$1$

$L2 =$

$1/s$

$L3 =$

$s/(s^2 + 4\pi^2)$

$L4 =$

$1/(s + 3)$

### Problem 2

```
iL1 = ilaplace(1, t)           % dirac(t)
iL2 = ilaplace(1/s)            % 1 - supposed to be u(t)
iL3 = ilaplace(1/(s+3))        % exp(-3*t)
```

---

```

iL4 = ilaplace(1/(s-4j))           % exp(t*4i)

iL1 =

dirac(t)

iL2 =

1

iL3 =

exp(-3*t)

iL4 =

exp(t*4i)

```

## Problem 3

```

% 3.1
upzor = [1 -7 14 8];
downzor = [1 -8 11 20];
[i, love, you] = residue(upzor,downzor);

answertolife1 = i(1)/(s-love(1))+i(2)/(s-love(2))+i(3)/(s-love(3))+you

% 3.2
upzor = [1 0 1 8];
downzor = [1 2 1];
[i, love, you] = residue(upzor,downzor);

answertolife2 = i(1)/(s-love(1))+i(2)/(s-love(2))+s*you(1)+you(2)

answertolife1 =

14/(3*(s - 5)) - 16/(5*(s - 4)) - 7/(15*(s + 1)) + 1

answertolife2 =

s + 10/(s + 1) - 2

```

## Problem 4

```

H = exp(-s)/(s+1); h = ilaplace(H);

```

---

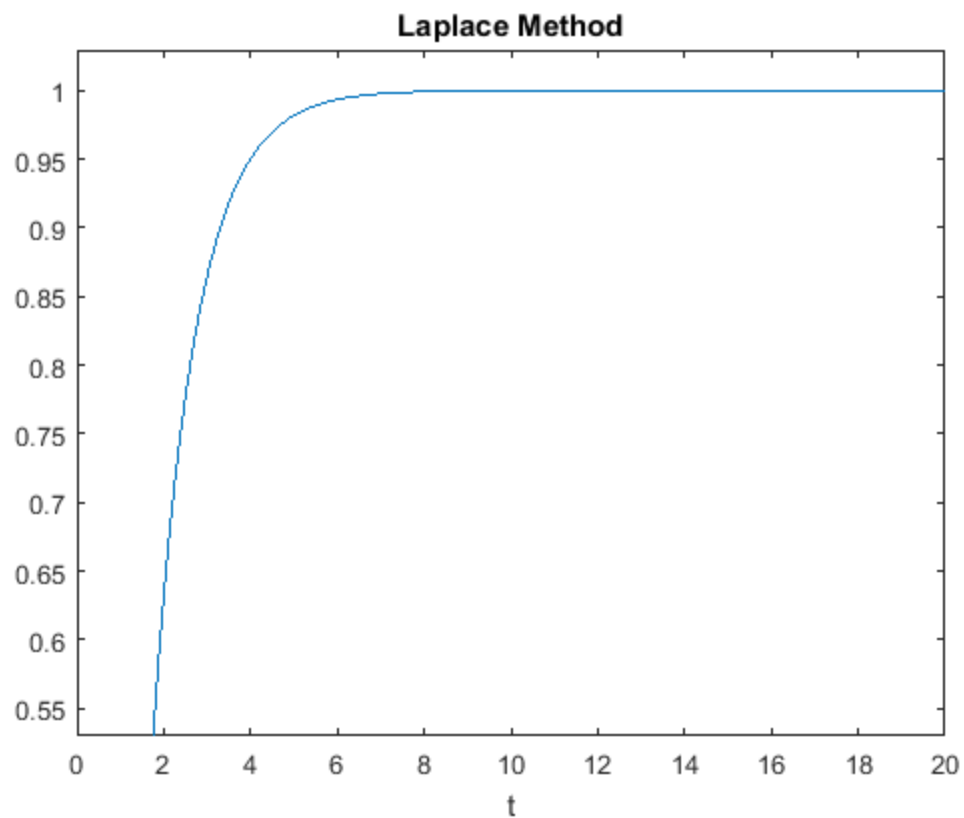
```
x = heaviside(t); X = laplace(x);

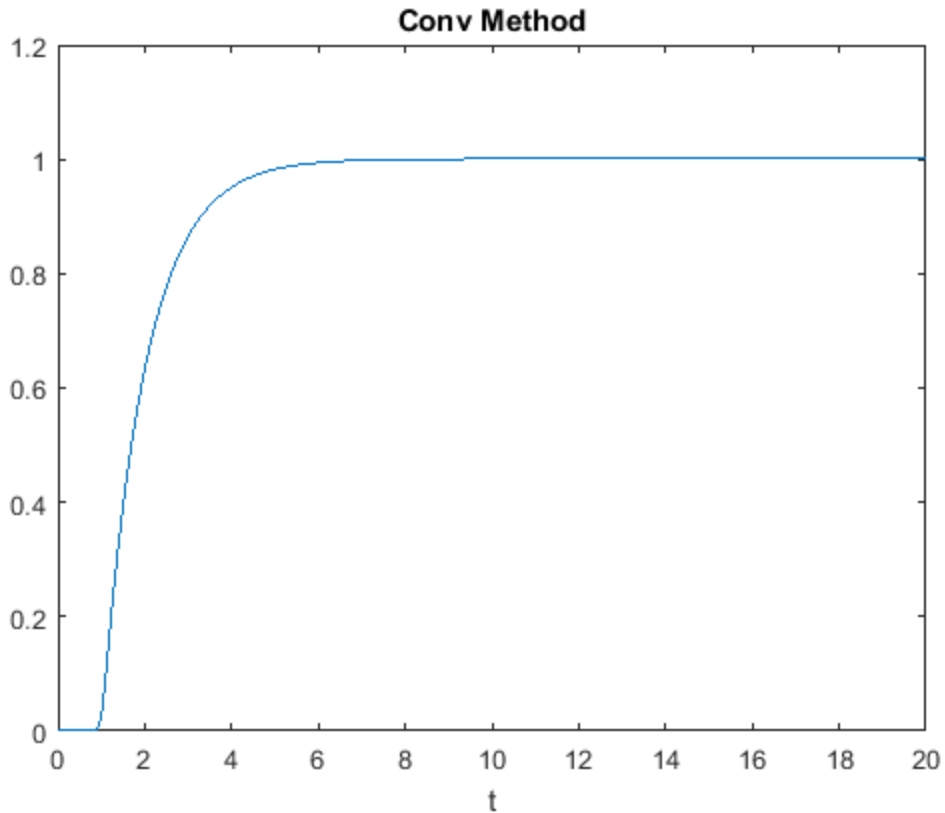
% Laplace Method
thank = X*H;
you = ilaplace(thank,t);

figure;
ezplot(you, [0 20])
title('Laplace Method'); xlabel('t');

% Conv Method
t1 = 0:.1:20;
x1 = eval(subs(x,t,t1));
h1 = eval(subs(h,t,t1));
you = conv(x1,h1)*.1;

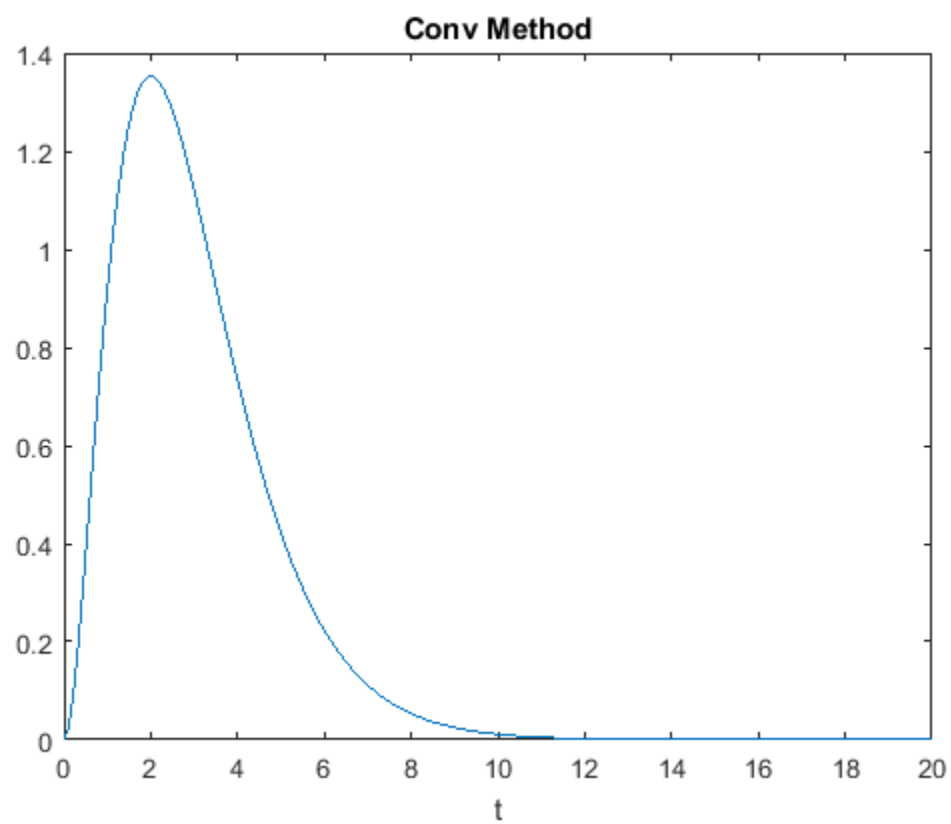
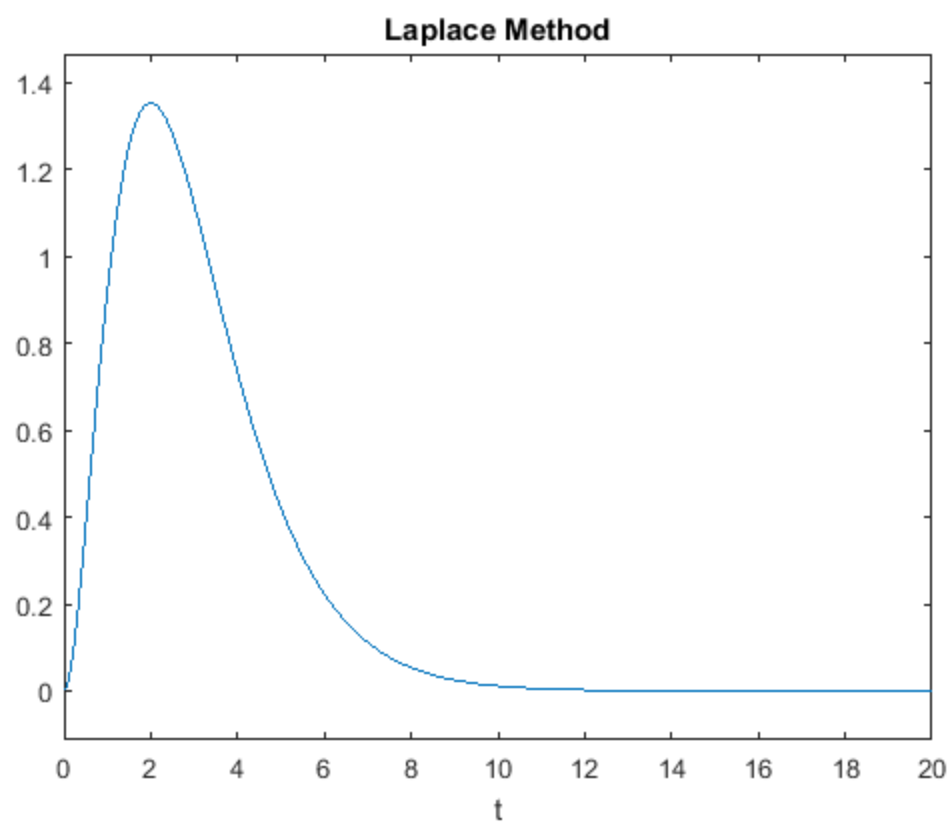
figure;
plot(0:.1:40,you);
title('Conv Method'); xlabel('t');
xlim([0 20])
```





## Problem 5

```
x = 5*exp(-t)*heaviside(t); X = laplace(x);  
h = t*exp(-t)*heaviside(t); H = laplace(h);  
  
% Laplace Method  
f0r = X*H;  
everything = ilaplace(f0r, t);  
  
figure;  
ezplot(everything, [0 20])  
title('Laplace Method'); xlabel('t');  
  
% Conv Method  
t1 = 0:.1:20;  
x1 = eval(subs(x,t,t1));  
h1 = eval(subs(h,t,t1));  
everything = conv(x1,h1)*.1;  
  
figure;  
plot(0:.1:40,everything);  
title('Conv Method'); xlabel('t');  
xlim([0 20])
```



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