Tarea #3

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Salida de un circuito RCL con la función de transferencia

$$\frac{V_{out}(S)}{V_{in}(S)} = \frac{L*S^2}{L*S^2+R*S+\frac{1}{C}}$$

Entradas : Impulso, Escalon, Rampa

1) $$V_{out}(S) = \frac{L*S^2}{L*S^2+R*S+\frac{1}{C}}$$

L= 1mH

R=1kΩ

C=1µF

Aplicamos Fracciones Parciales

```
>> num=[0.001 0 0]

>> den=[0.001 1000 1000000]
```

```
>> pkg load control
>> [r,p,k]=residue(num,den)
```

```
r =

          1.00402
  -1000001.00402

p =

     -1001.00201
  -998998.99799

k =  1
```

Ulilizando Wolfram Alpha aplicamos la inversade latranformada de La Place y graficamos la respuesta inverse Laplace transform (- (1*10^6)/(s+998999))+((1.00402)/(s+1001))+1

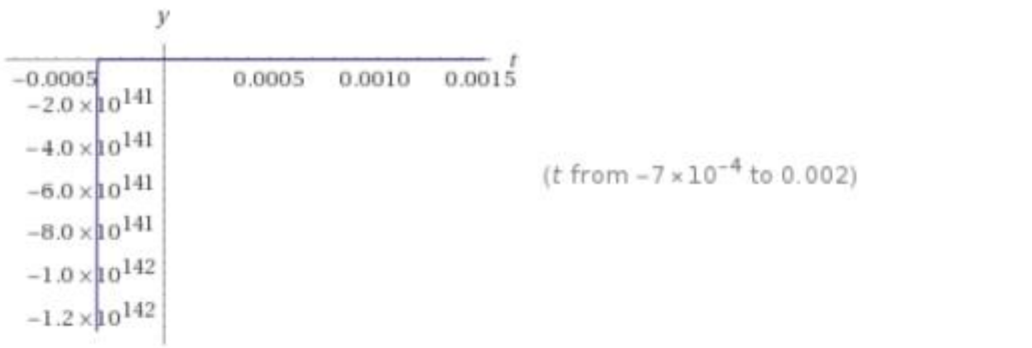
Input interpretation:

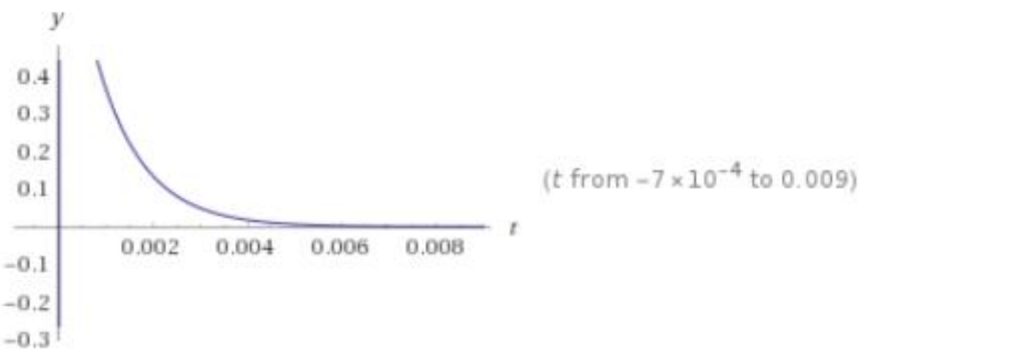
$$\mathcal{L}_s^{-1}\left[-\frac{1\times10^6}{s+998\,999}+\frac{1.00402}{s+1001}+1\right](t)$$

Result:

$$-1\times10^6\, e^{-998999\,t}+\delta(t)+1.00402\, e^{-1001\,t}$$

Plots:





$$V_{out}(S)=\frac{L*S}{L*S^2+R*S+\frac{1}{C}}$$

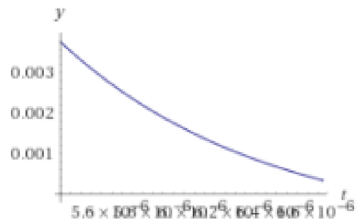
2) Ecalon Unitario

Con fracciones parciales y la inversa la place se deduce que:

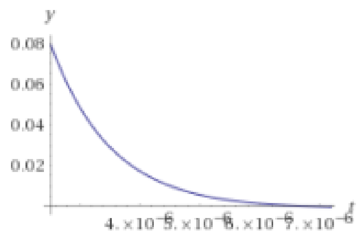
```
>> pkg load control
>> num=[0.001 0]
num =

   0.0010000   0.0000000

>> den=[0.001 1000 1000000]
den =

         0.0010000      1000.0000000   1000000.00000

>> [r,p,k]=residue(num,den)
r =

  -0.0010030
   1.0010030

p =

    -1001.00201
  -998998.99799

k = [](0x0)
```

Y de esta manera se puede obtener las gráficas de Escalón unitario

Plots:



(t from 5.4×10^{-6} to 6.6×10^{-6})



(t from 2.5×10^{-6} to 7.2×10^{-6})

3) Rampa

$$V_{out}(S) = \frac{L}{L * S^2 + R * S + \frac{1}{C}}$$

Aplicando la transformada de La place obtenemos

$$1x10^{-6} * e^{-1000t} - 1x10^{-6} * e^{-100\,000t}$$

Y la gráfica es la siguiente.