# Untitled

December 4, 2018

In [ ]:
```
import numpy as np
import matplotlib.pyplot as plt
from matplotlib.pyplot import *
import matplotlib


# Passos
tf = 13
dt = .1
dx = 2
k = 0.49/(2.7*0.2174)

lamb = (k * dt) / (dx)**2
#print (lamb)

# Tamanho da barra
L = 10

# Vetor da temperatura
X = np.arange(0, L+dx, dx)
Inst = np.arange(0, tf, dt)


# primeira posição: instante, segunda temperatura
T = np.zeros([len(Inst), len(X)])


##################   CONDIÇÃO INICIAL   ##################
#for i in range(1,len(X) -1):
#    T[0,i] = 2*X[i]


##################   CONDIÇÕES DE CONTORNO   ##################
T[:, 0] = 100 # Esquerda
T[:, -1] = 50 # Direita


#print("T inicial")
```

```
#print(T[0,:])
################   SOLUÇÃO   ###################

for l in range(1, len(Inst) -1):
        for i in range(1,len(X) -1):
            T[l,i] = T[l-1,i] + lamb*(T[l-1,i+1] -2*T[l-1,i] + T[l-1,i-1])


#print("T depois")
#print(T)
####################   PLOTS   ######################

fig, ax = plt.subplots() # Cria a figura com um subplot
pcolor(T, cmap='jet')
cbar = colorbar()


cbar.ax.set_ylabel('Temperatura [řC]', fontsize=12)
ax.set_ylabel('Tempo [x 10 s]', fontsize=16)
show()


plt.plot(X,T[30,:],X,T[60,:],X,T[90,:],X,T[120,:])
plt.legend(('3s','6s','9s','12s'))
plt.xlabel('x [cm]', fontsize=16)
plt.ylabel('Temperatura [řC]', fontsize=16)
```