In [2]:

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"""
Fourier Transform of F(t) = exp(-|t|)
Fourier transform using numpy.fft method
"""
import numpy as np
import matplotlib.pyplot as plotter
# How many time points are needed i,e., Sampling Frequency
samplingFrequency = 10
# At what intervals time points are sampled
samplingInterval = 1 / samplingFrequency
# Begin time period of the signals
beginTime = 0
# End time period of the signals
endTime = 10

# Time points
time = np.arange(beginTime, endTime, samplingInterval);
# Funct --> F(t) = exp(-abs(t))
Funct = np.exp(-abs(time))

# Create subplot
figure, axis = plotter.subplots(2, 1)
plotter.subplots_adjust(hspace=1)
# Time domain representation for function

axis[0].set_title('Exp(-t)')
axis[0].plot(time, Funct)
axis[0].set_xlabel('Time')
axis[0].set_ylabel('Function')

# Frequency domain representation

# Normalize Function
fourierTransform = np.fft.fft(Funct)/len(Funct)
 # Exclude sampling frequency
fourierTransform = fourierTransform[range(int(len(Funct)/2))]

tpCount     = len(Funct)
values      = np.arange(int(tpCount/2))
timePeriod  = tpCount/samplingFrequency
frequencies = values/timePeriod
```

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# Frequency domain representation
axis[1].set_title('Fourier transform')
axis[1].plot(frequencies, abs(fourierTransform))
axis[1].set_xlabel('Frequency')
axis[1].set_ylabel('Transform G')
plotter.show()
```

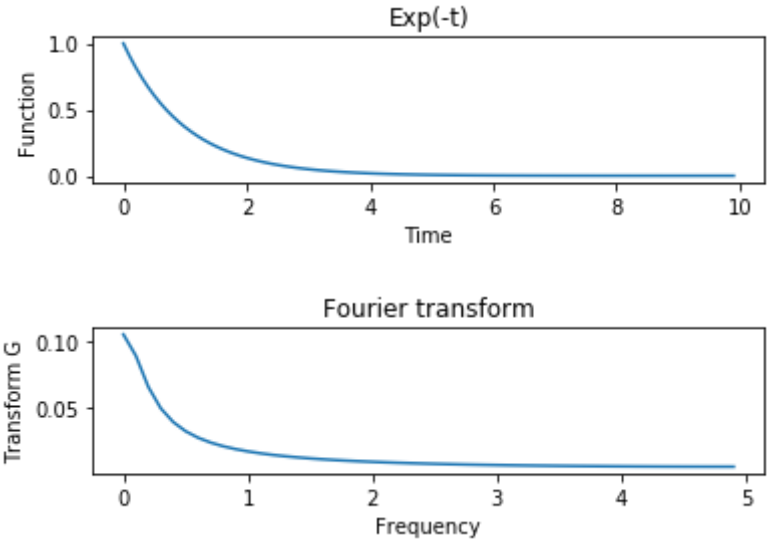

In [ ]: