EXP-1.2

Impulse sampling

Name: Rajanayagam K

Reg.no: 212224060202

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# Impulse Sampling
import numpy as np
import matplotlib.pyplot as plt
from scipy.signal import resample
fs = 100
t = np.arange(0, 1, 1/fs)
f = 5
signal = np.sin(2 * np.pi * f * t)
plt.figure(figsize=(10, 4))
plt.suptitle("NAME : RAJANAYAGAM K\nREG NO : 212224060202",fontsize=12, fontweight='bold', y=1.05)
plt.plot(t, signal, label='Continuous Signal')
plt.title('Continuous Signal (fs = 100 Hz)')
plt.xlabel('Time [s]')
plt.ylabel('Amplitude')
plt.grid(True)
plt.legend()
plt.show()
t_sampled = np.arange(0, 1, 1/fs)
signal_sampled = np.sin(2 * np.pi * f * t_sampled)
plt.figure(figsize=(10, 4))
plt.plot(t, signal, label='Continuous Signal', alpha=0.7)
plt.stem(t_sampled, signal_sampled, linefmt='r-', markerfmt='ro',
basefmt='r-', label='Sampled Signal (fs = 100 Hz)')
plt.title('Sampling of Continuous Signal (fs = 100 Hz)')
plt.xlabel('Time [s]')
plt.ylabel('Amplitude')
plt.grid(True)
plt.legend()
plt.show()
reconstructed_signal = resample(signal_sampled, len(t))
plt.figure(figsize=(10, 4))
# plt.plot(t, signal, label='Continuous Signal', alpha=0.7)
plt.plot(t, reconstructed_signal, 'r--', label='Reconstructed Signal (fs = 100 Hz)')
plt.title('Reconstruction of Sampled Signal (fs = 100 Hz)')
plt.xlabel('Time [s]')
plt.ylabel('Amplitude')
plt.grid(True)
plt.legend()
plt.show()
```

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REG NO : 212224060202