Contents

Sine Wave

```
clc;
clear;
close all;
```

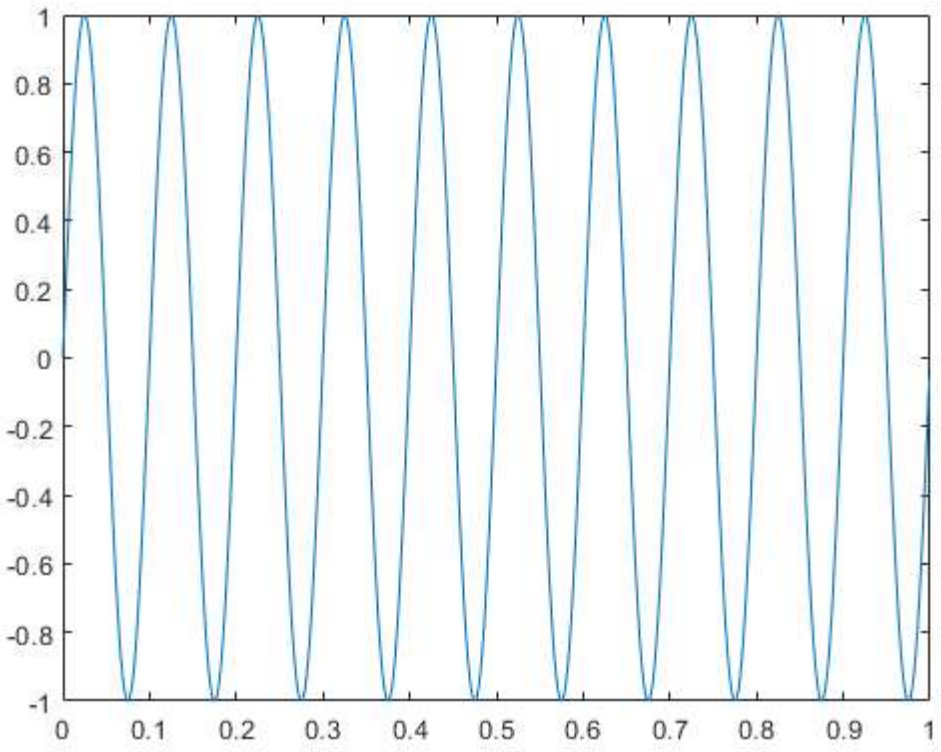
Signal duration in seconds

```
T = 1;                  % Signal duration
Fs = 1000;              % Sampling frequency (Hz)
t = 0:1/Fs:T-1/Fs;      % Time vector
```

Signal generation (example: sinusoidal signal)

```
f_signal = 10;          % Frequency of the sinusoidal signal (Hz)
A_signal = 1;           % Amplitude of the sinusoidal signal
signal = A_signal * sin(2*pi*f_signal*t);
plot(t, signal);

SNR_dB = 1;                                     % Signal-to-noise ratio in decibels
noise_power = var(signal) / (10^(SNR_dB/10));   % Calculate noise power
noise = sqrt(noise_power) * randn(size(t));     % Generate AWGN
```



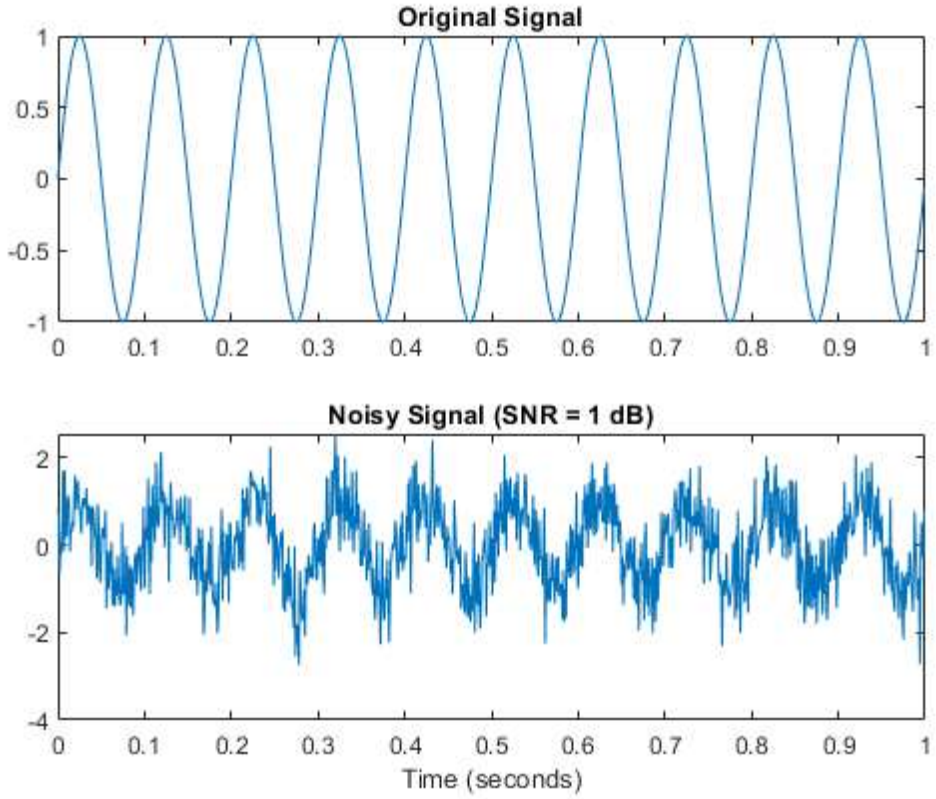
Add noise to the signal

```
noisy_signal = signal + noise;
```

Plot the original signal and the noisy signal

```
subplot(2,1,1);
plot(t, signal);
title('Original Signal');

subplot(2,1,2);
plot(t, noisy_signal);
title(['Noisy Signal (SNR = ' num2str(SNR_dB) ' dB)']);
xlabel('Time (seconds)');
```



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