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Square Wave

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

Parameters

```
Fs = 1000;           % Sampling frequency (Hz)
T = 1;               % Signal duration in seconds
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 * square(2*pi*f_signal*t);
```

Noise generation

```
SNR_dB = 20;          % 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

```
figure;
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)');
```

