clc;

clear all;

Fs = 1000; % sampling frequency 1 kHz

t = 0 : 1/Fs : 0.296; % time scale

f = 200; % Hz, embedded dominant frequency

x = cos(2\*pi\*f\*t) + randn(size(t)); % time series

plot(t,x), axis('tight'), grid('on'), title('Time series'), figure

nfft = 512; % next larger power of 2

y = fft(x,nfft); % Fast Fourier Transform

y = abs(y.^2); % raw power spectrum density

y = y(1:1+nfft/2); % half-spectrum

[v,k] = max(y); % find maximum

f\_scale = (0:nfft/2)\* Fs/nfft; % frequency scale

plot(f\_scale, y),axis('tight'),grid('on'),title('Dominant Frequency')

f\_est = f\_scale(k); % dominant frequency estimate

fprintf('Dominant freq.: true %f Hz, estimated %f Hznn', f, f\_est)

fprintf('Frequency step (resolution) = %f Hznn', f\_scale(2))

**OUTPUT:**

**Dominant freq.: true 200.000000 Hz, estimated 199.218750 HznnFrequency step (resolution) = 1.953125 Hznn**

