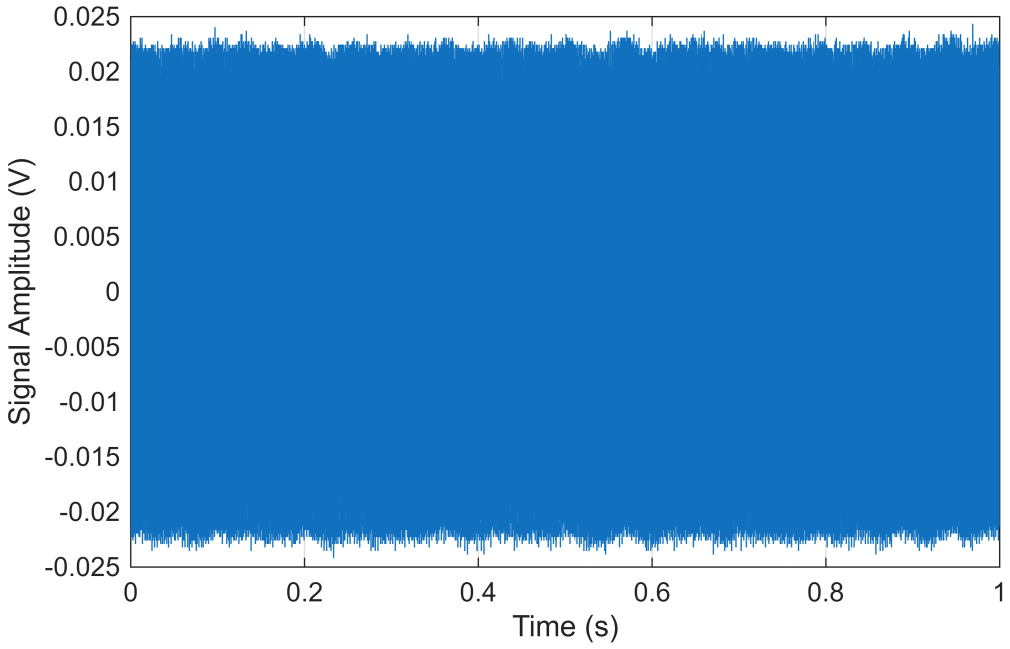
```
%Load the calibration data file
 load calibration.dat
% Assign the variables to data i.e(Microphone signal and Sample start time)
V = calibration(1,:); %electronic signal(Volts)
t_s = calibration(2,:);%time in seconds
V_s = V;
%plot of the time domain of the calibration signal
figure;
plot(t_s, V_s )
xlabel('Time (s)')
ylabel('Signal Amplitude (V)')
grid on
```




```
%converting the calibration signal from the time domain to the frequency
%domain
f_s = 1/ mean(diff(t_s)); %  sampling frequency(samples/sec)
x = detrend(V_s(:), 0);  %removes the DC offset
N = numel(x);
w = hann(N,'periodic');   % window : fade in from zero and fade out to zero which
further helps to remove sampling noise and get the correct peak values
cg = mean(w);   %fixes amplitude drop cuased by window
%take the FFT
X = fft(x .* w);
f = (0:N-1)*(f_s/N);
N2 = floor(N/2)+1;   %finds the index of the half way point
f = f(1:N2)';
Vmag = abs(X(1:N2))*2/(cg*N);  %calc the true amplitudes of  the spectrum
[~, pk] = max(Vmag);
f0 = f(pk);   %calibrator frequency
V_peak = V_s(pk);
figure;
```

```
 semilogx(f, Vmag); %plot of the  calibration signal spectrum
xlabel("frequency(Hz)")
ylabel("Signal Amplitude[V](FFT)")
%title(sprintf('Calibration FFT, peak at %.1f Hz', f0));
p_ref = 20e-6;       % reference pressure [Pa]
%At    1kHz The calibration source generates pure tone at a 94dB therefore
SPL_dB = 94;
p_calib = 10^(SPL_dB/20) * p_ref;  % Calculate the calibration sound  pressure
V_rms = rms(V_s );% root mean square of the Voltage signal values
S = V_rms/p_calib; %Microphone sensitivity
fprintf("the Microphone sensitvity of the miscrophone used is %d. VPa^-1\n",S)
```

```
the Microphone sensitvity of the miscrophone used is 1.557903e-02. VPa^-1
```

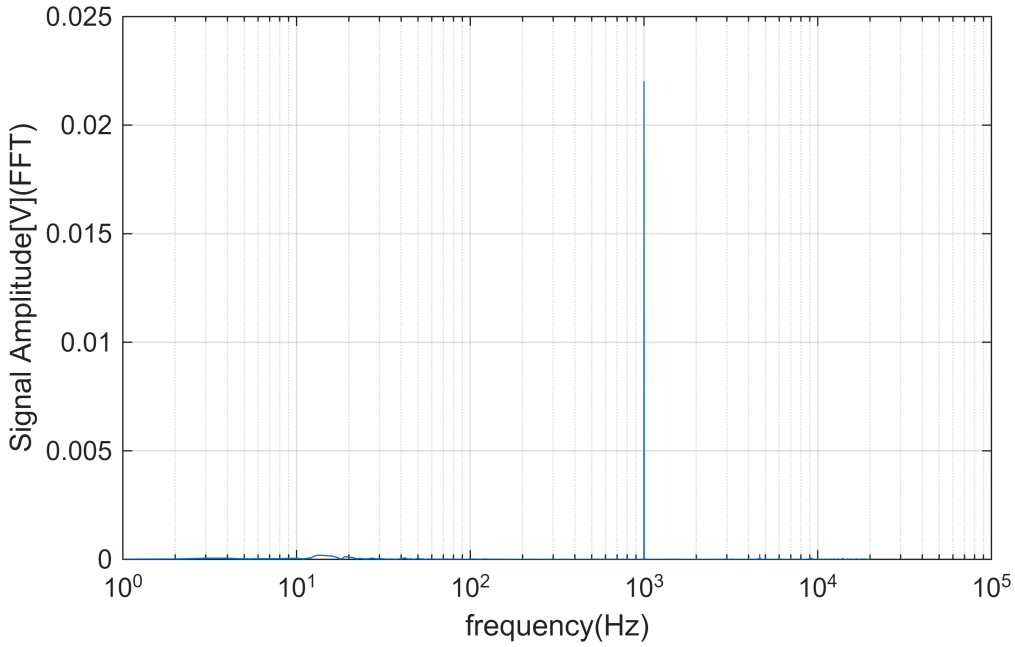
```
fprintf(' Fundamental frequency (Pure tone) ≈ %.2f Hz\n', f0);
```

```
 Fundamental frequency (Pure tone) ≈ 1000.00 Hz
```

```
fprintf(' Volatage Amplitude at Fundamental frequency  %.3f V\n', V_peak);
```

```
 Volatage Amplitude at Fundamental frequency  0.021 V
```

```
grid on
```




```
fprintf('the number of elements inside V_s %d.\n' , numel(V_s));
```

```
the number of elements inside V_s 40000.
```