**1. Your report should be written in English. The report should include the code (with comments or notes), the resulted figure (or print-screen), and a short discussion on the result if necessary.**

**2. Upload: .m file, .fig file and .doc report**

**3. Pack all the above files and send to 1315480535@qq.com**

**4. The format of pack name: LabX\_ID\_Name.zip, X is the experiment number.**

**5. Deadline: Thursday in Next week.**

**Complete the following tasks:**

1. Generate the following signal, where the duration is [0,5], sampling rate is 1000Hz. Plot the signal and its magnitude spectrum.

**x(t)=t\*sin(100\*pi\*t), for t within [0,2]**

**x(t)=(sin(pi\*t)+2) \*sin(100\*pi\*t), otherwise**

2. Calculate the energy and power of x(t), in both time domain and frequency domain, and verify the equality.

3. Plot the time-averaged autocorrelation and the power spectral density of x(t) and verify the **Wiener-Khinchin theorem.**

4. (**Optional**) Plot the quadrature component of x(t) where the carrier fc=50Hz, also plot the corresponding spectrum. Does the signal x(t) have in-phase component?