**1.2 Nyquist criterion**

**1.2.1 According to Nyquist, what is the minimum value of the sampling frequency that can be used to not degrade the signal above, x(t)?**

minimum value of fs = 1600

**1.2.2. To illustrate the Nyquist criterion, choose relevant values of fs (choose multiple values above and below the minimum you identified) and listen to the obtained numeric signals x[n]. Can you verify the theory? Please write down the values of fs you chose and explain what impact you have observed.**

Yes, I can verify the theory.

I will choose the values of fs as 400, 800, 1600, 3200, 6400 Hz.

When the sample frequency is getting higher, the quality of the voice is also getting higher, and there will be less alias.

**1.2.3. Let’s suppose once more that fs = 8000 Hz. Plot the sampled version of two sinewaves, one with frequency f0 = 800 Hz, the other with frequency f0 = 7200 Hz, both sampled with fs = 8000 Hz. You can also listen to both. What do you observe? Comment on the results with reference to the theory you covered in lectures**

**Listen to the sound**

**1.2.4 Load the ’handel’ audio .wav file in your script and listen to it. What is the sampling rate of this signal? Now undersample at successively decreasing sampling frequencies until you notice a change. What is the frequency where you first perceive aliasing? Describe what the effect of aliasing sounds like to you. Plot the original audio file and its under-sampled version using subplot. As usual, label everything appropriately**