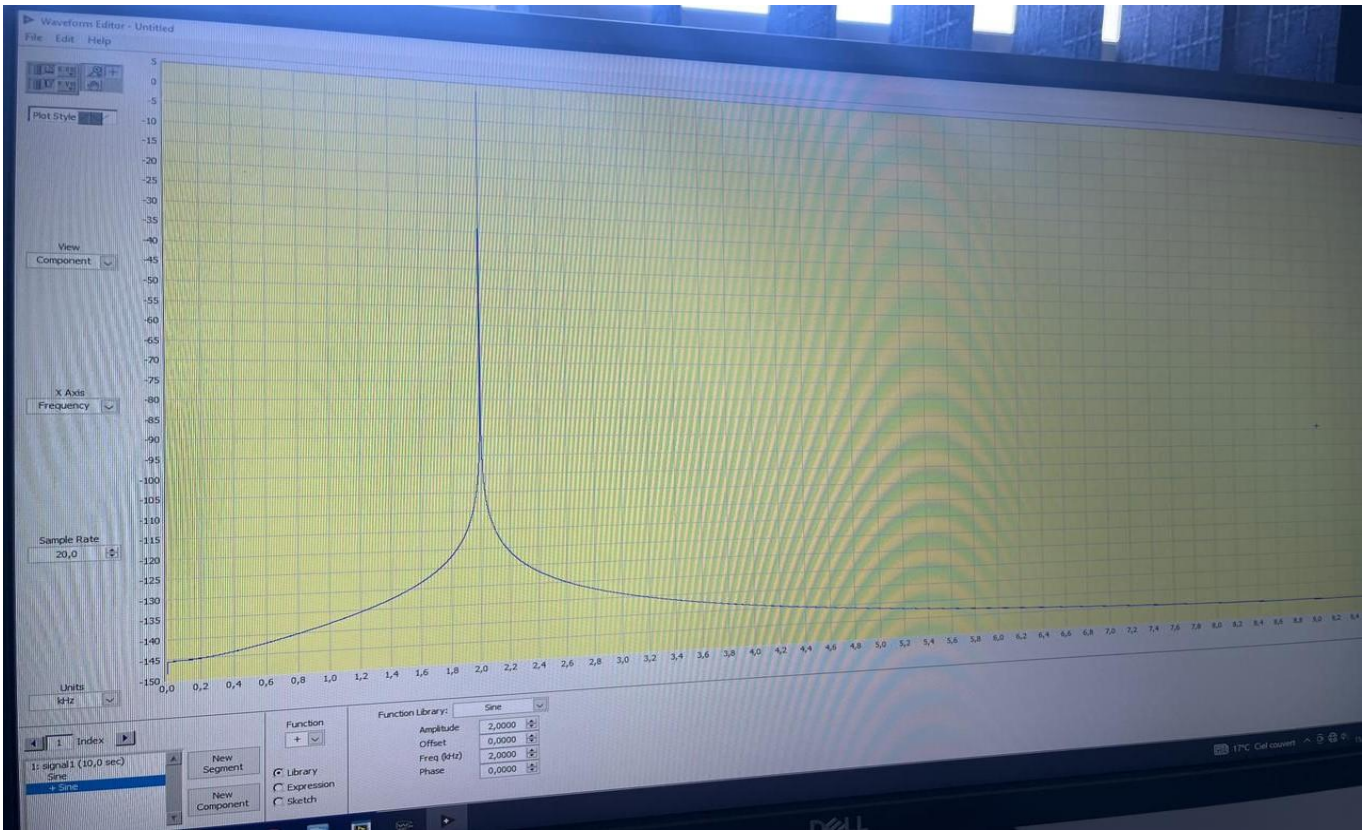
RAPPORT TP1

1-NI ELVIS II+ :DSP :

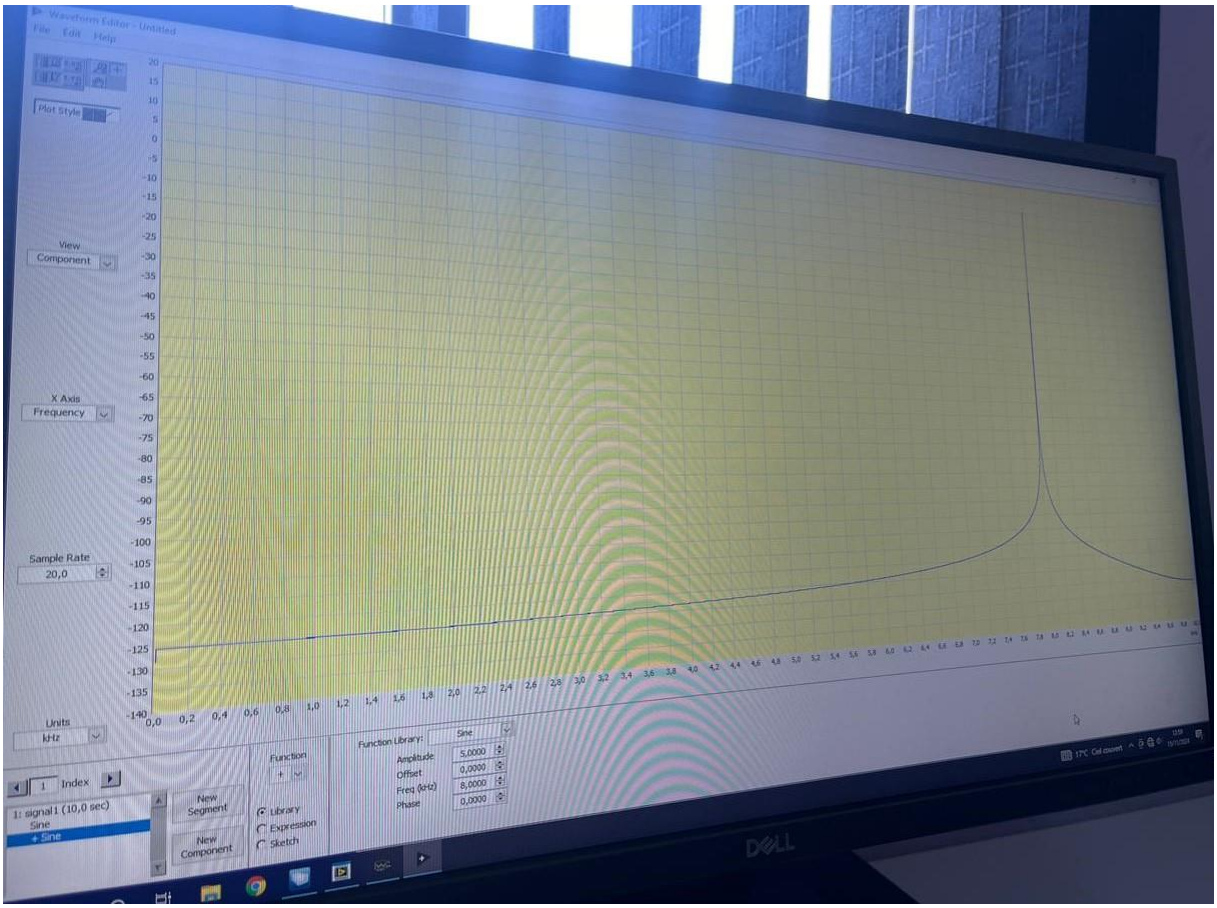
➢ PART1:Arbitrary Waveform Generator(ARB)

- **Sine.A=1,f=1khz:**

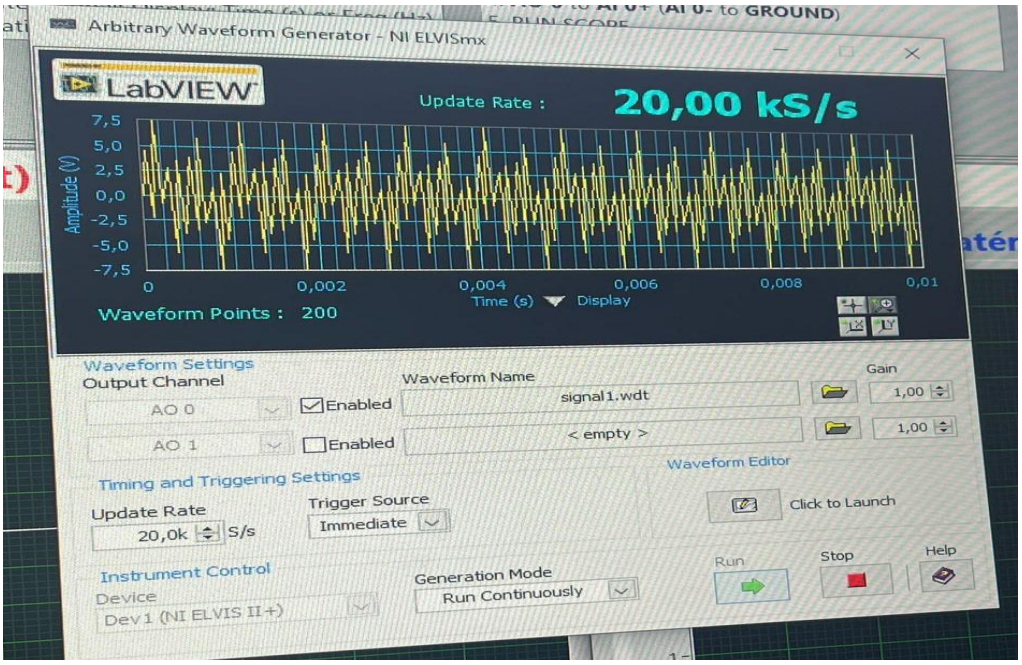
- **Sine.A=2,f=2khz** :



- **<u>Sine.A=5,f=8khz</u>** :

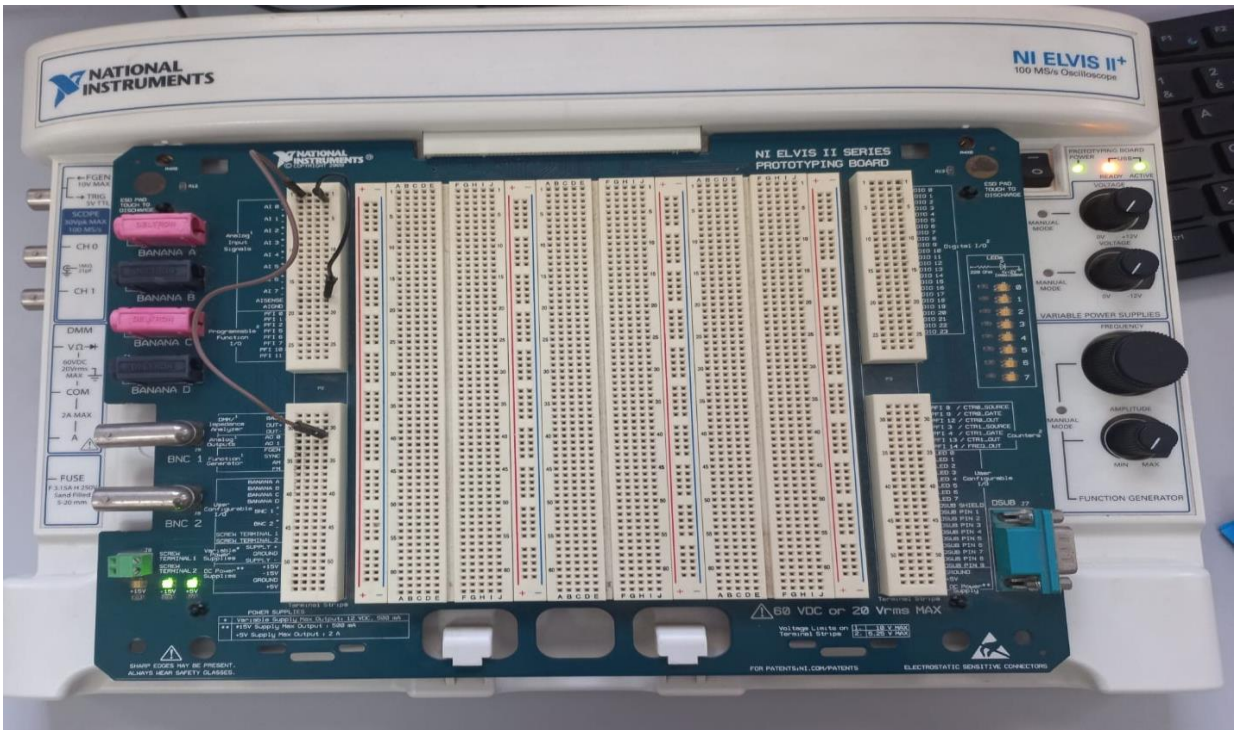


➢ PART2 : visualisation du signal sur ARB



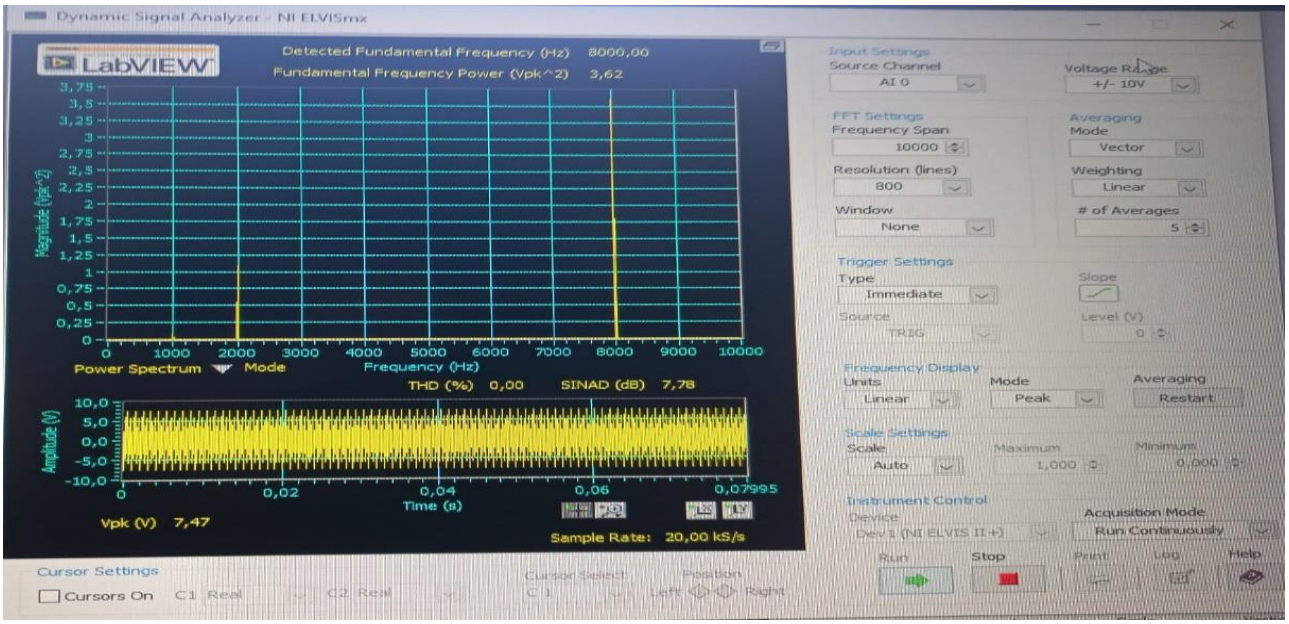
➢ PART3 :Visualisation du signal sur SCOPE

2- Channel 0 Settings. Source (AI 0). Click Enabled. RUN :



6. View/Check Generated Signal :

➢ PART 4: Visualisation du Signal sur (DSA)

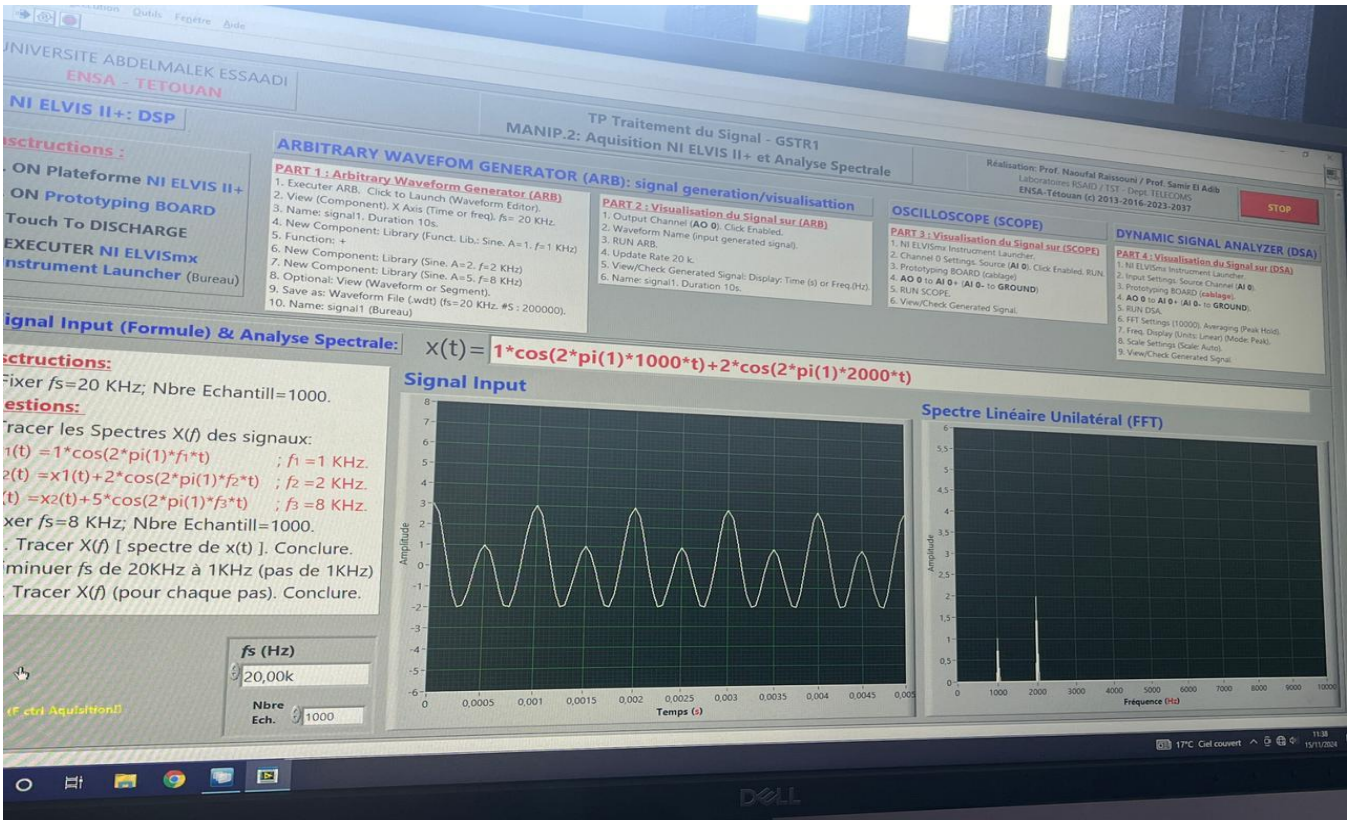


2-Signal Input(Formule) &Analyse Spectrale :

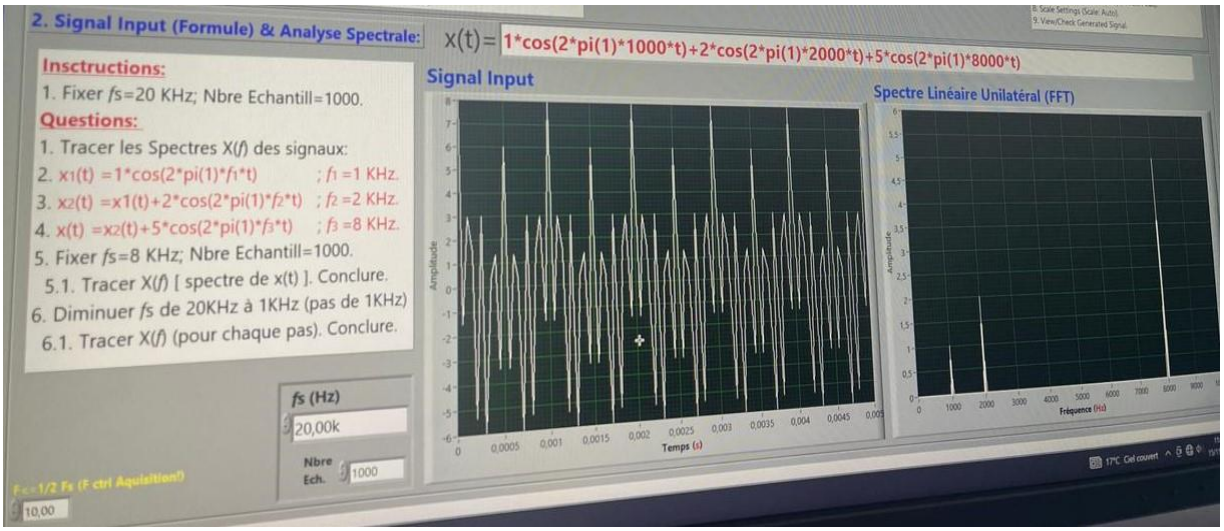
QUESTIONS :

1-x1(t)=1*cos(2*pi(1)*f1*t) ;f1=1Khz

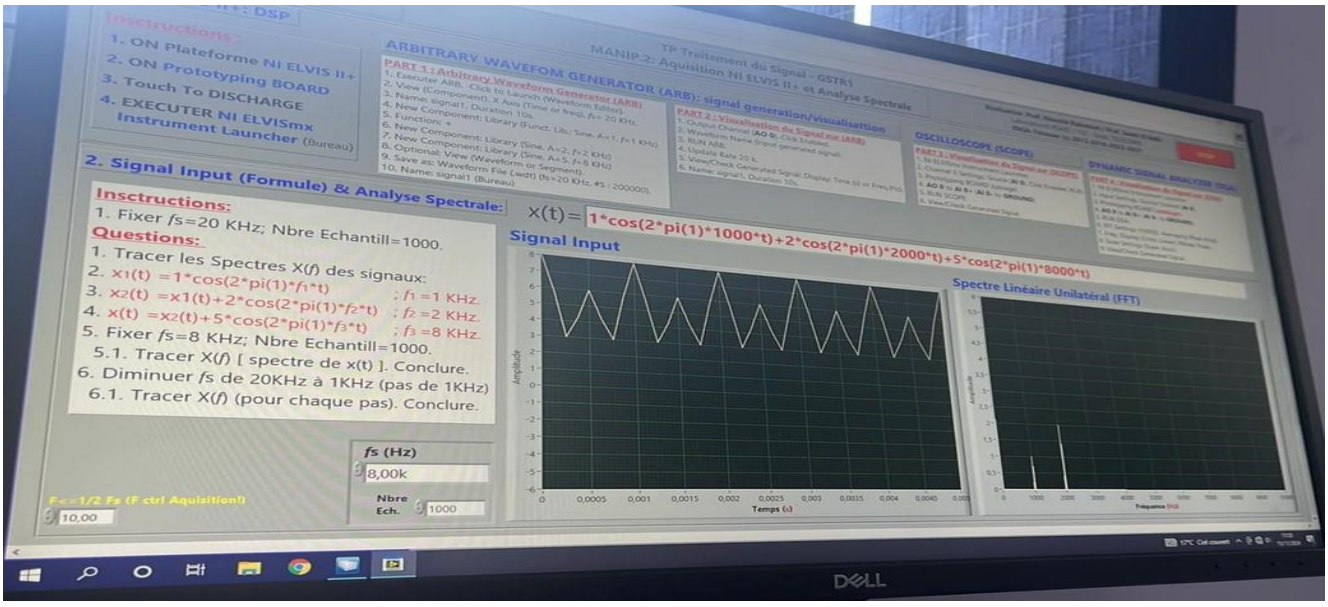
2-x2(t)=1*cos(2*pi(1)*f1*t) +2*cos(2*pi(1)*f2*t) : f2=2khz



3-x3(t)= 1*cos(2*pi(1)*f1*t) +2*cos(2*pi(1)*f2*t+5*cos(2*pi(1)*f3*t) : f3=8khz



5.1 :spectre de x(t)

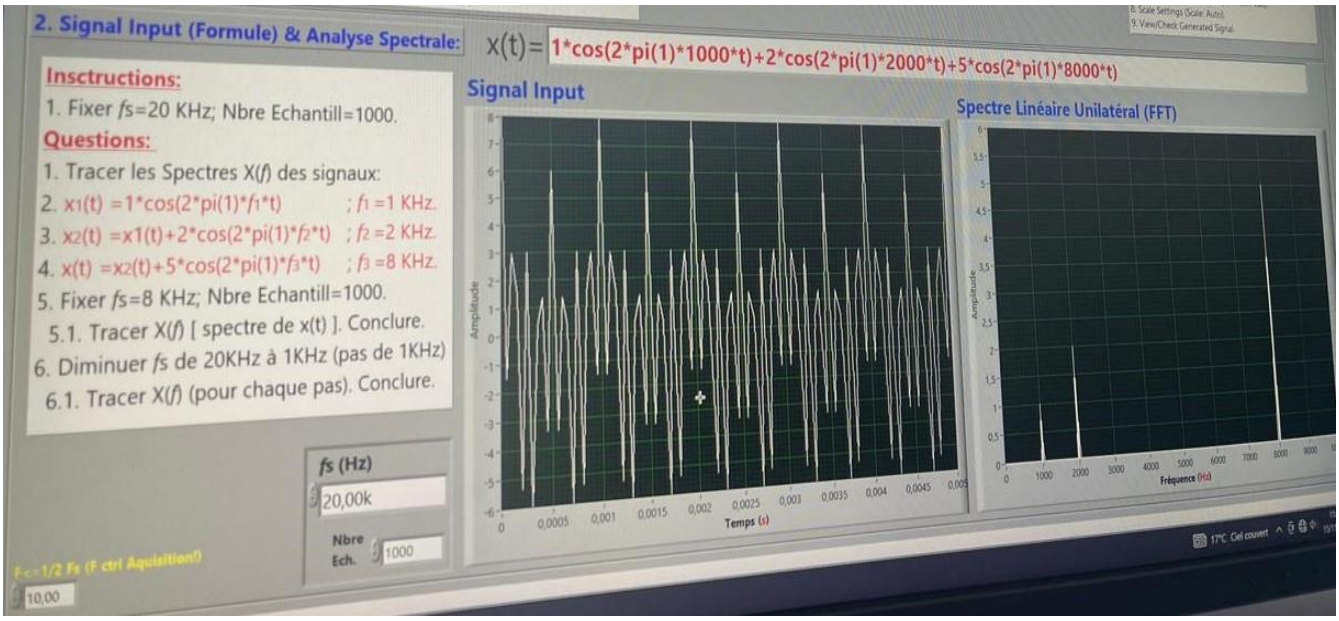


- <u>Conclusion :</u>

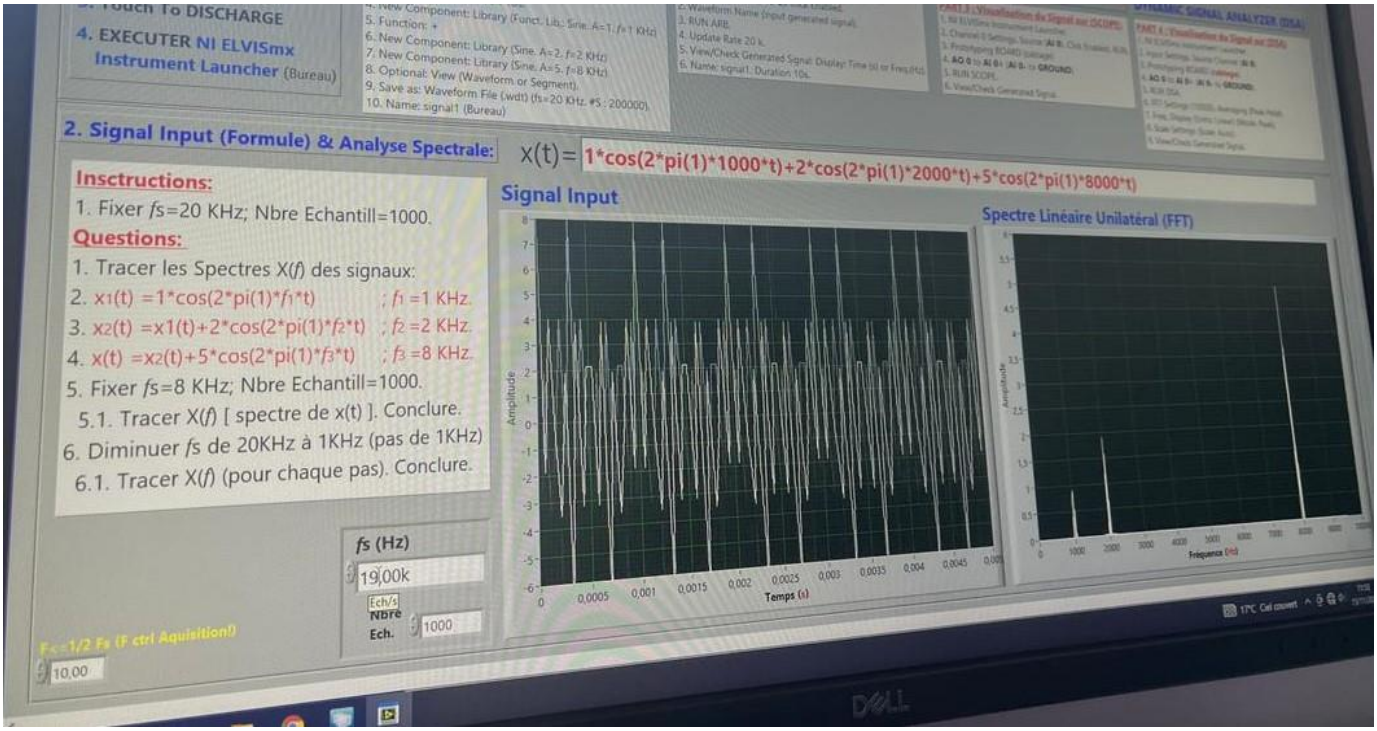
Quand la fréquence d'échantillonnage diminue progressivement, le phénomène d'aliasing s'accentue, entraînant une déformation croissante du spectre . Pour éviter cet aliasing, il est essentiel de choisir une fréquence d'échantillonnage supérieure à deux fois la fréquence maximale du signal.

6.1 :

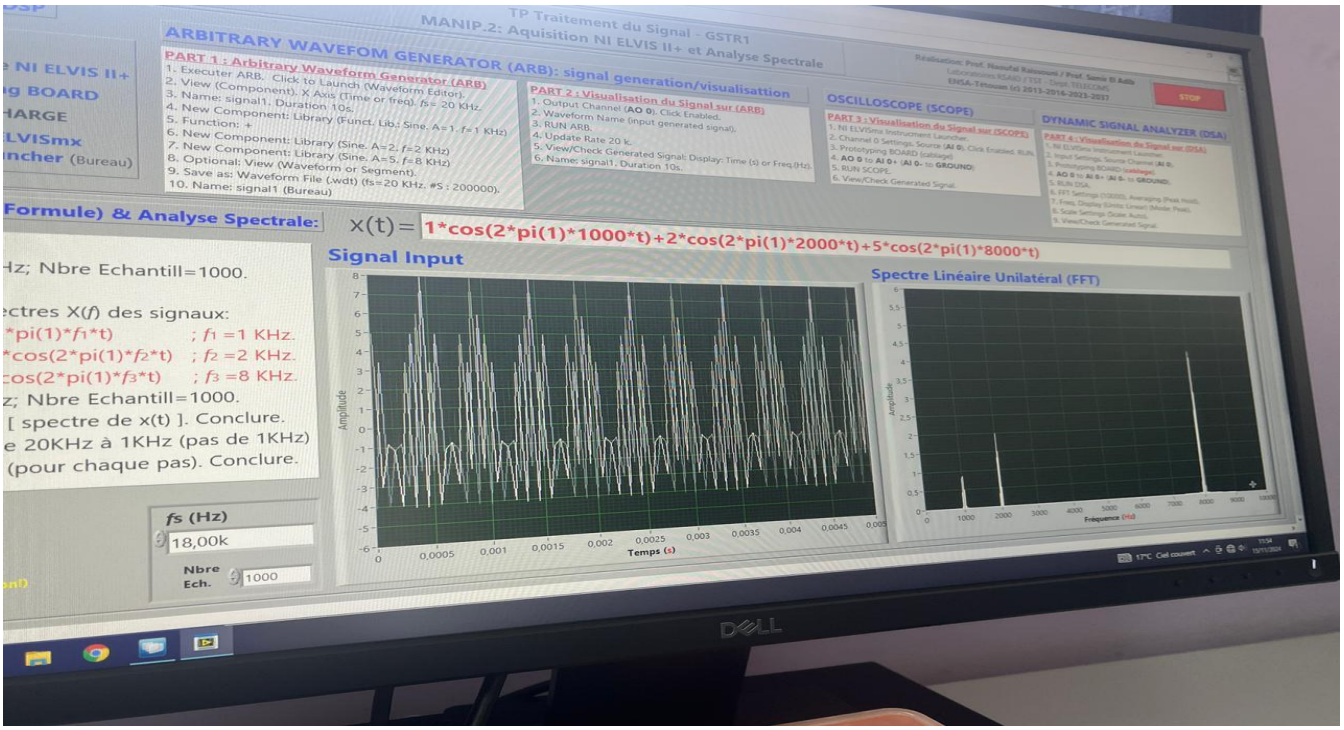
Fs= 20khz :



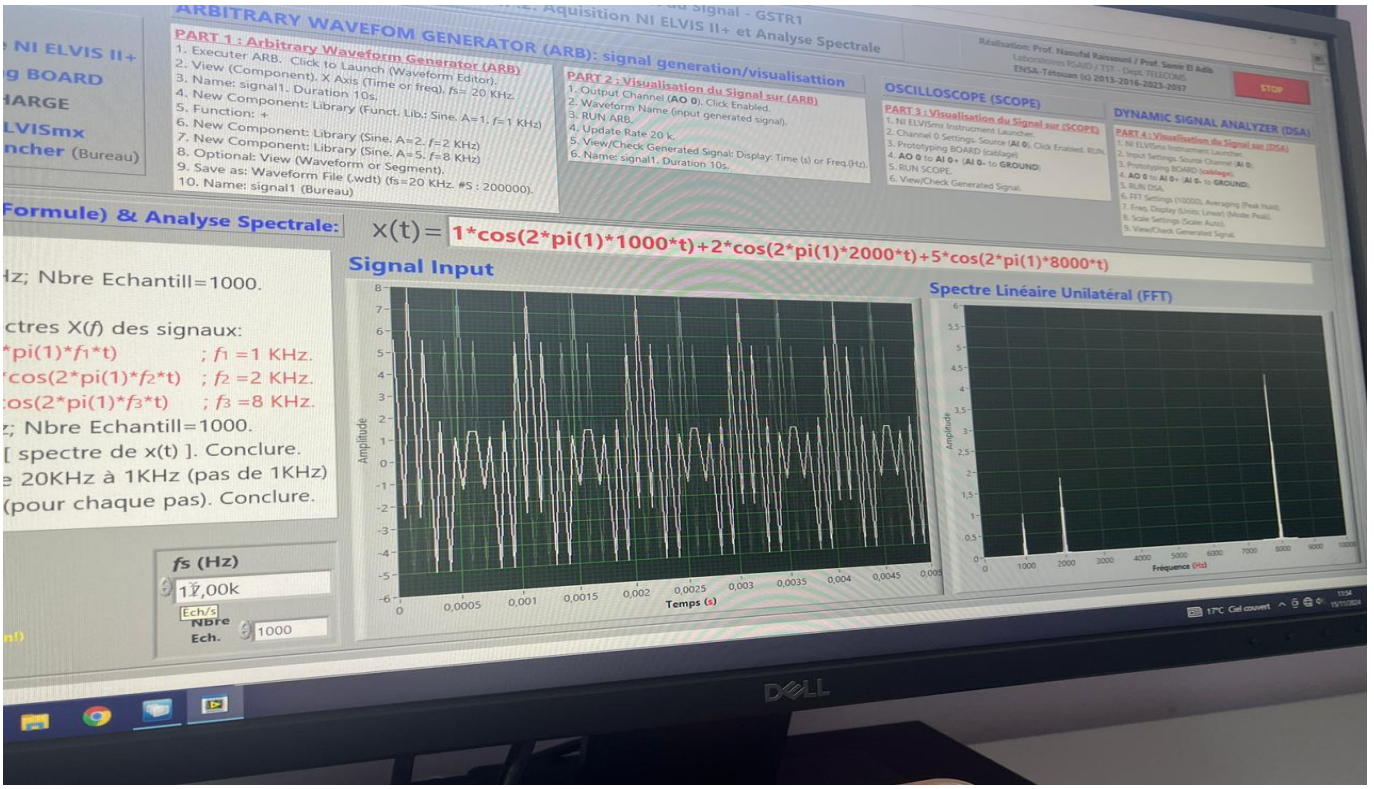
Fs=19 Khz :



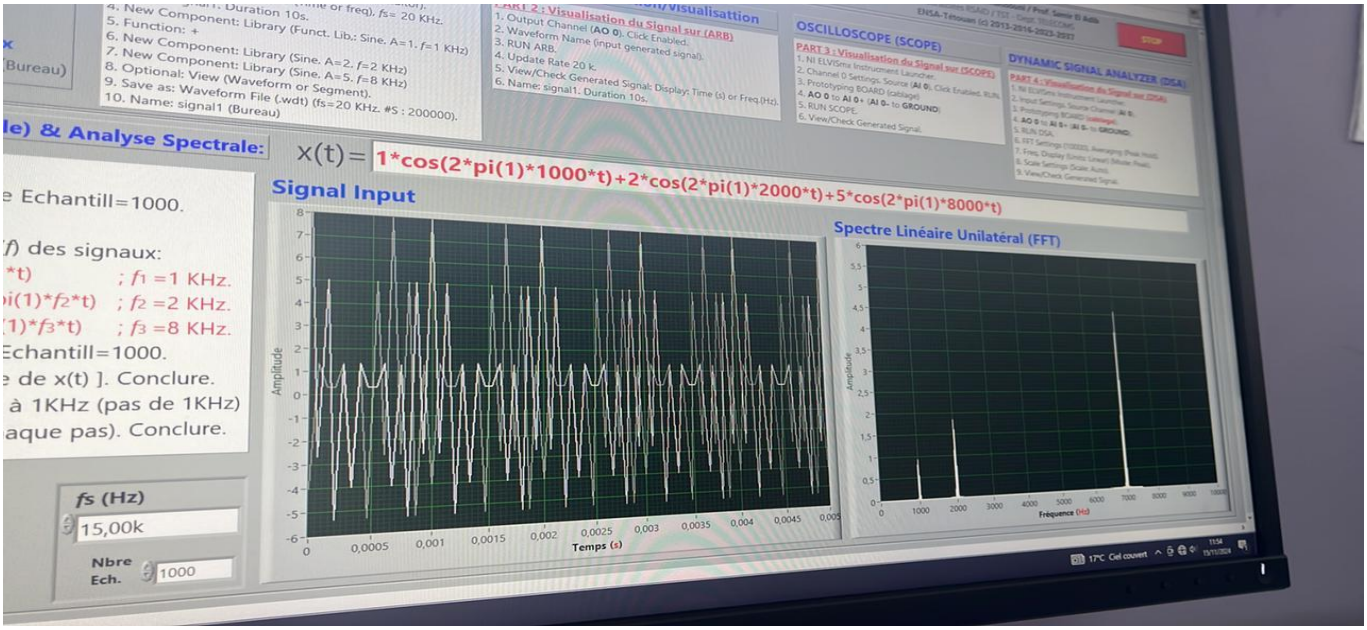
Fs=18 khz :


TP Traitement du Signal - GSTR1
MANIP.2: Aquisition NI ELVIS II+ et Analyse Spectrale
ARBITRARY WAVEFOM GENERATOR (ARB): signal generation/visualisattion
PART 1 : Arbitrary Waveform Generator (ARB)
1. Executer ARB. Click to Launch (Waveform Editor).
2. View (Component). X Axis (Time or freq). fs= 20 KHz.
3. Name: signal1. Duration 10s.
4. New Component: Library (Funct. Lib.: Sine. A=1. f=1 KHz)
5. Function: +
6. New Component: Library (Sine. A=2. f=2 KHz)
7. New Component: Library (Sine. A=5. f=8 KHz)
8. Optional: View (Waveform or Segment).
9. Save as: Waveform File (.wdt) (fs=20 KHz. #S : 200000).
10. Name: signal1 (Bureau)
PART 2 : Visualisation du Signal sur (ARB)
1. Output Channel (AO 0). Click Enabled.
2. Waveform Name (input generated signal).
3. RUN ARB.
4. Update Rate 20 k.
5. View/Check Generated Signal: Display: Time (s) or Freq.(Hz).
6. Name: signal1. Duration 10s.
OSCILLOSCOPE (SCOPE)
PART 3 : Visualisation du Signal sur (SCOPE)
DYNAMIC SIGNAL ANALYZER (DSA)
PART 4 : Visualisation du Signal sur (DSA)
STOP
Formule) & Analyse Spectrale:
x(t) = 1*cos(2*pi(1)*1000*t)+2*cos(2*pi(1)*2000*t)+5*cos(2*pi(1)*8000*t)
Hz; Nbre Echantill=1000.
ctres X(f) des signaux:
*pi(1)*f1*t) ; f1 =1 KHz.
*cos(2*pi(1)*f2*t) ; f2 =2 KHz.
cos(2*pi(1)*f3*t) ; f3 =8 KHz.
z; Nbre Echantill=1000.
[spectre de x(t)]. Conclure.
e 20KHz à 1KHz (pas de 1KHz)
(pour chaque pas). Conclure.
Signal Input
Spectre Linéaire Unilatéral (FFT)
Amplitude
Temps (s)
Fréquence (Hz)
fs (Hz)
18,00k
Nbre Ech.
1000
DELL

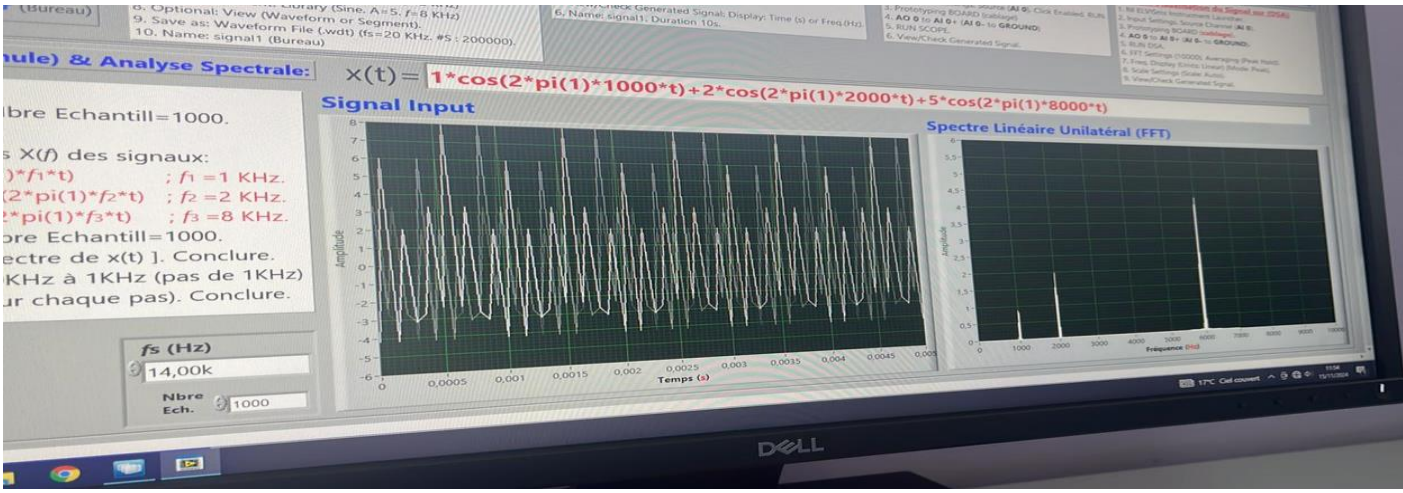
Fs=17khz :


ARBITRARY WAVEFOM GENERATOR (ARB): signal generation/visualisattion
PART 1 : Arbitrary Waveform Generator (ARB)
1. Executer ARB. Click to Launch (Waveform Editor).
2. View (Component). X Axis (Time or freq). fs= 20 KHz.
3. Name: signal1. Duration 10s.
4. New Component: Library (Funct. Lib.: Sine. A=1. f=1 KHz)
5. Function: +
6. New Component: Library (Sine. A=2. f=2 KHz)
7. New Component: Library (Sine. A=5. f=8 KHz)
8. Optional: View (Waveform or Segment).
9. Save as: Waveform File (.wdt) (fs=20 KHz. #S : 200000).
10. Name: signal1 (Bureau)
PART 2 : Visualisation du Signal sur (ARB)
OSCILLOSCOPE (SCOPE)
PART 3 : Visualisation du Signal sur (SCOPE)
DYNAMIC SIGNAL ANALYZER (DSA)
PART 4 : Visualisation du Signal sur (DSA)
STOP
Formule) & Analyse Spectrale:
x(t) = 1*cos(2*pi(1)*1000*t)+2*cos(2*pi(1)*2000*t)+5*cos(2*pi(1)*8000*t)
Hz; Nbre Echantill=1000.
ctres X(f) des signaux:
*pi(1)*f1*t) ; f1 =1 KHz.
*cos(2*pi(1)*f2*t) ; f2 =2 KHz.
os(2*pi(1)*f3*t) ; f3 =8 KHz.
z; Nbre Echantill=1000.
[spectre de x(t)]. Conclure.
e 20KHz à 1KHz (pas de 1KHz)
(pour chaque pas). Conclure.
Signal Input
Spectre Linéaire Unilatéral (FFT)
Amplitude
Temps (s)
Fréquence (Hz)
fs (Hz)
17,00k
Ech/s
Nbre Ech.
1000
DELL

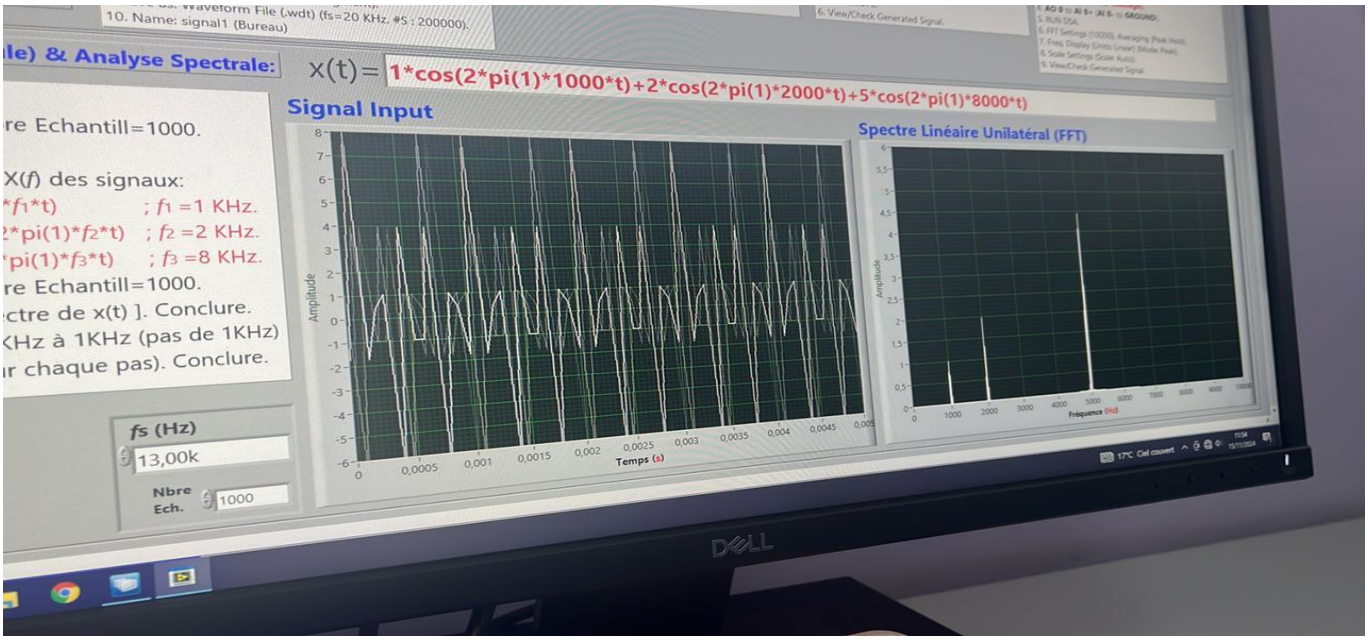
Fs=15 khz :



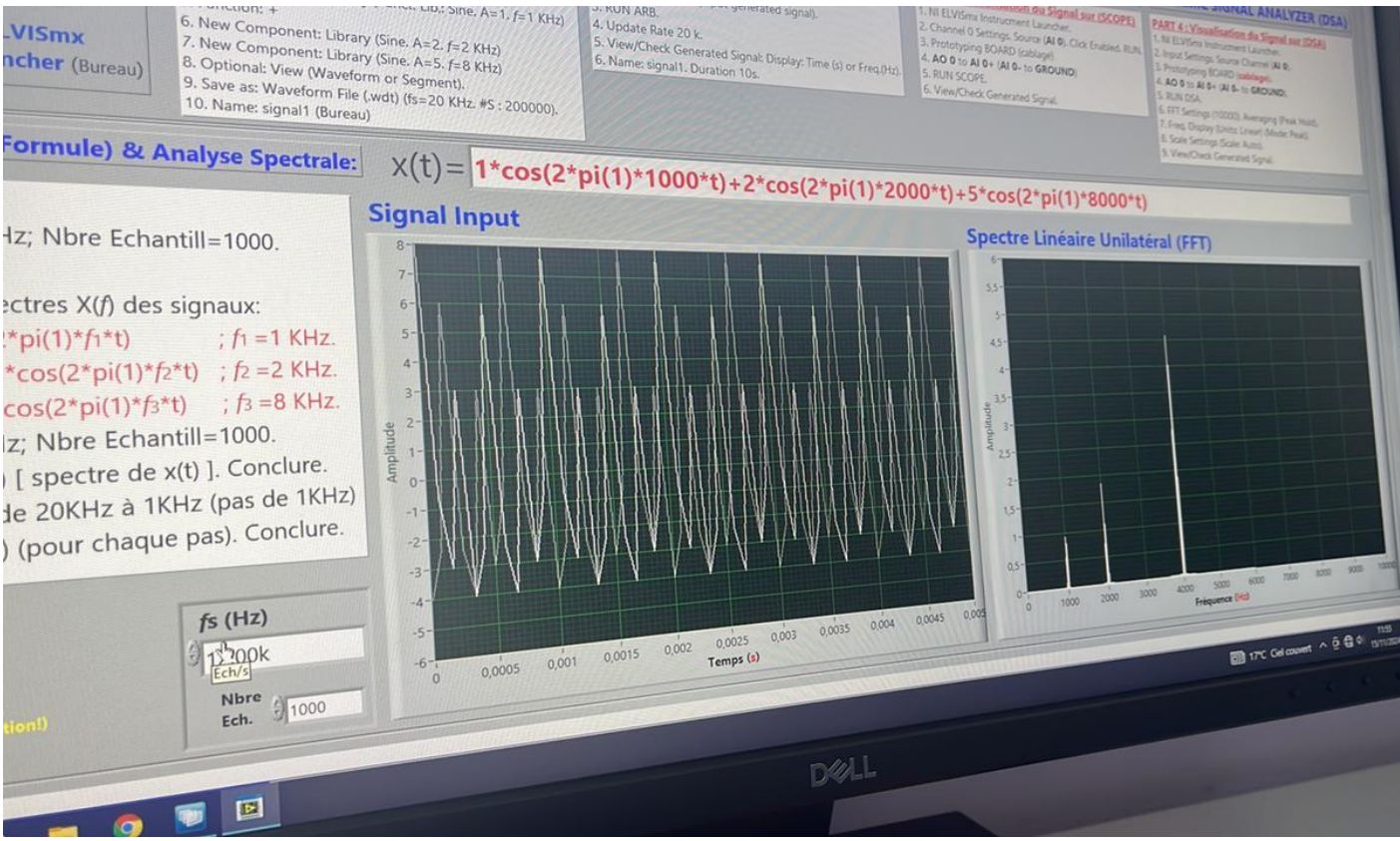
Fs= 14 khz :



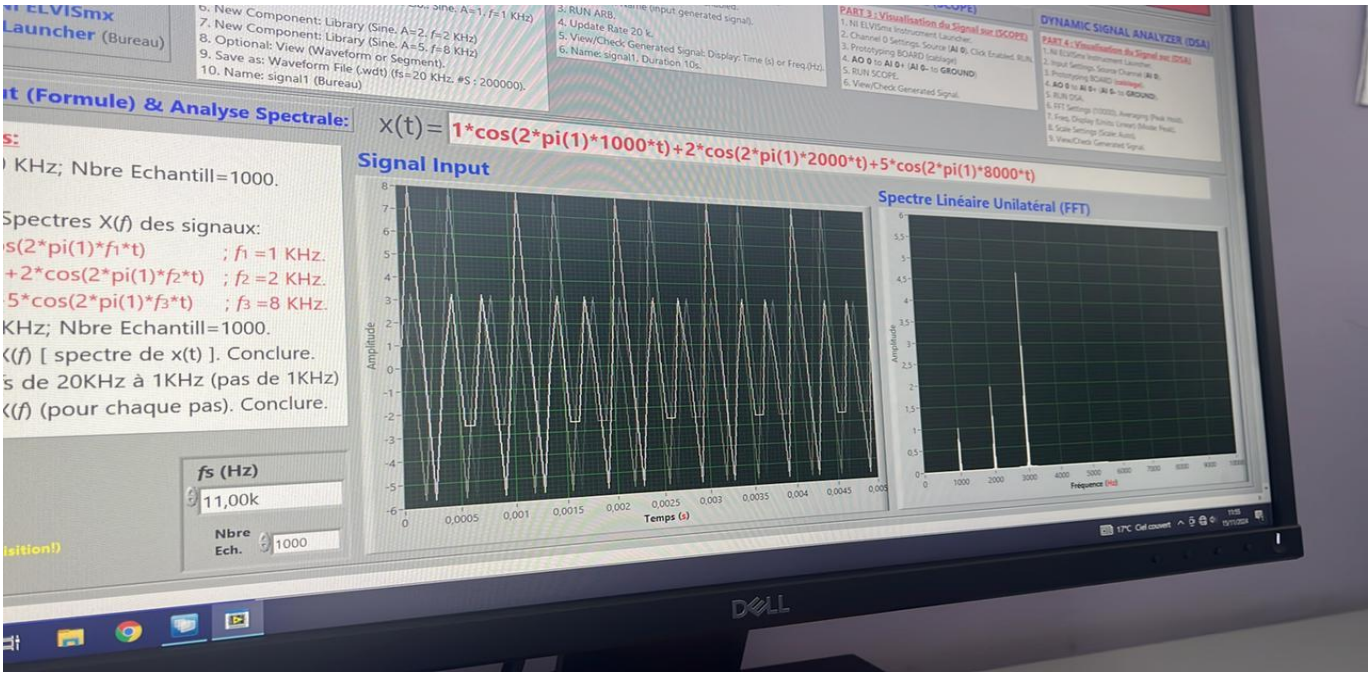
Fs= 13 khz :


10. Name: signal1 (Bureau).
le) & Analyse Spectrale:
x(t)= 1*cos(2*pi(1)*1000*t)+2*cos(2*pi(1)*2000*t)+5*cos(2*pi(1)*8000*t)
re Echantill=1000.
X(f) des signaux:
*f1*t) ; f1 =1 KHz.
2*pi(1)*f2*t) ; f2 =2 KHz.
pi(1)*f3*t) ; f3 =8 KHz.
re Echantill=1000.
ctre de x(t)]. Conclure.
KHz à 1KHz (pas de 1KHz)
ir chaque pas). Conclure.
fs (Hz)
13,00k
Nbre Ech.
1000
Signal Input
Amplitude
Temps (s)
Spectre Linéaire Unilatéral (FFT)
Amplitude
Fréquence (Hz)

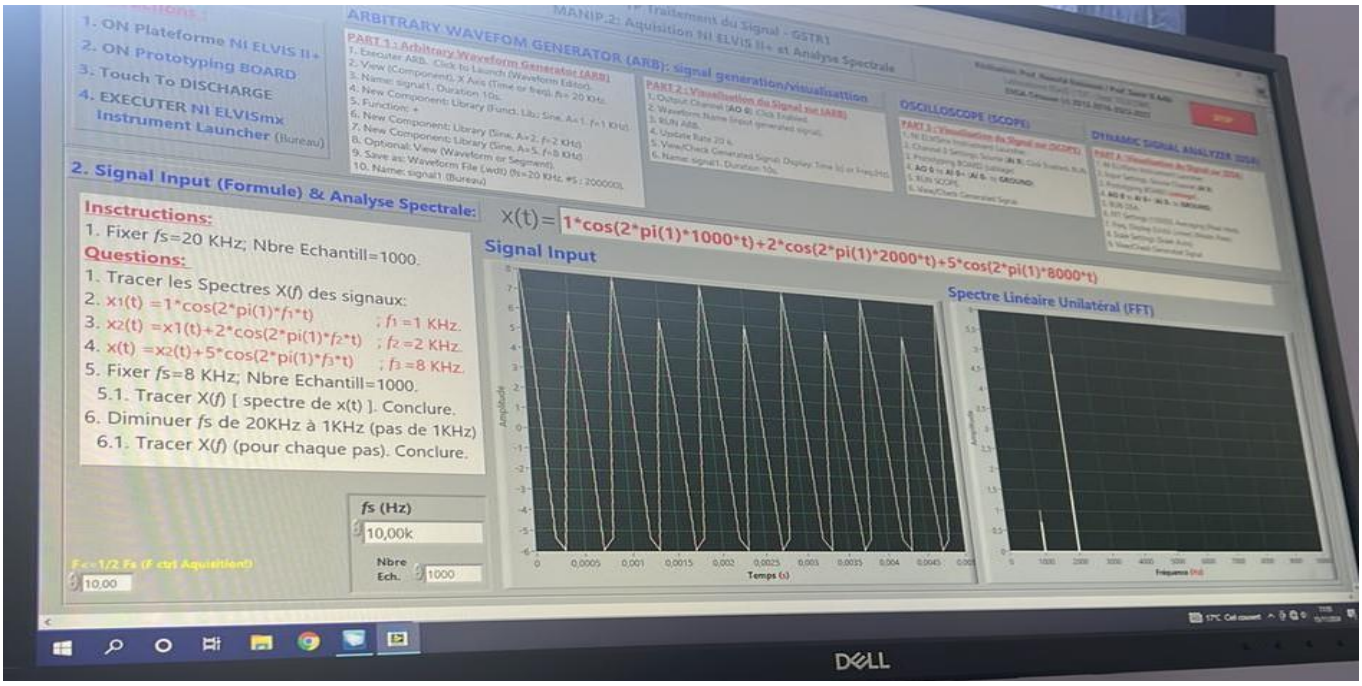
Fs=12 khz :


6. New Component: Library (Sine. A=2. f=2 KHz)
7. New Component: Library (Sine. A=5. f=8 KHz)
8. Optional: View (Waveform or Segment).
9. Save as: Waveform File (.wdt) (fs=20 KHz. #S : 200000).
10. Name: signal1 (Bureau)
4. Update Rate 20 k.
5. View/Check Generated Signal: Display: Time (s) or Freq.(Hz).
6. Name: signal1. Duration 10s.
2. Channel 0 Settings. Source (AI 0). Click Enabled. RUN.
3. Prototyping BOARD (cablage)
4. AO 0 to AI 0+ (AI 0- to GROUND).
5. RUN SCOPE.
6. View/Check Generated Signal.
Formule) & Analyse Spectrale:
x(t)= 1*cos(2*pi(1)*1000*t)+2*cos(2*pi(1)*2000*t)+5*cos(2*pi(1)*8000*t)
Hz; Nbre Echantill=1000.
ctres X(f) des signaux:
*pi(1)*f1*t) ; f1 =1 KHz.
*cos(2*pi(1)*f2*t) ; f2 =2 KHz.
cos(2*pi(1)*f3*t) ; f3 =8 KHz.
z; Nbre Echantill=1000.
[spectre de x(t)]. Conclure.
de 20KHz à 1KHz (pas de 1KHz)
(pour chaque pas). Conclure.
fs (Hz)
12,00k
Ech/s
Nbre Ech.
1000
Signal Input
Amplitude
Temps (s)
Spectre Linéaire Unilatéral (FFT)
Amplitude
Fréquence (Hz)

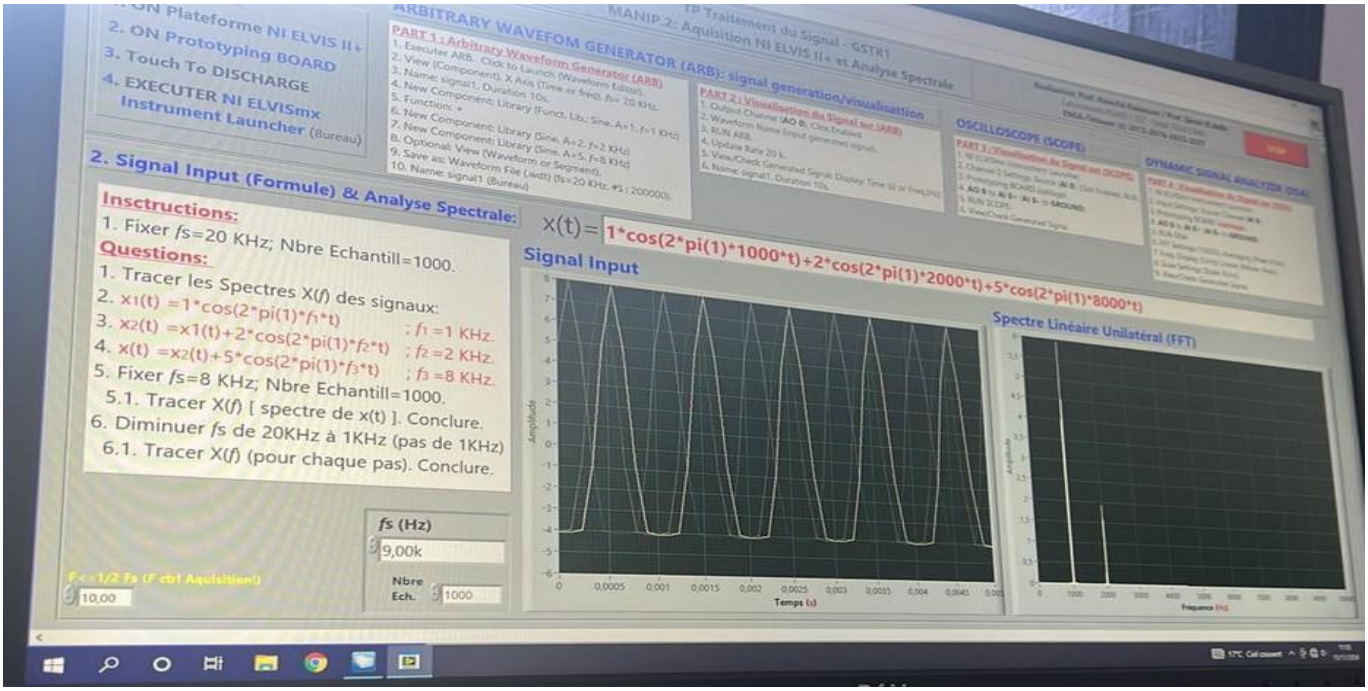
Fs=11 khz :



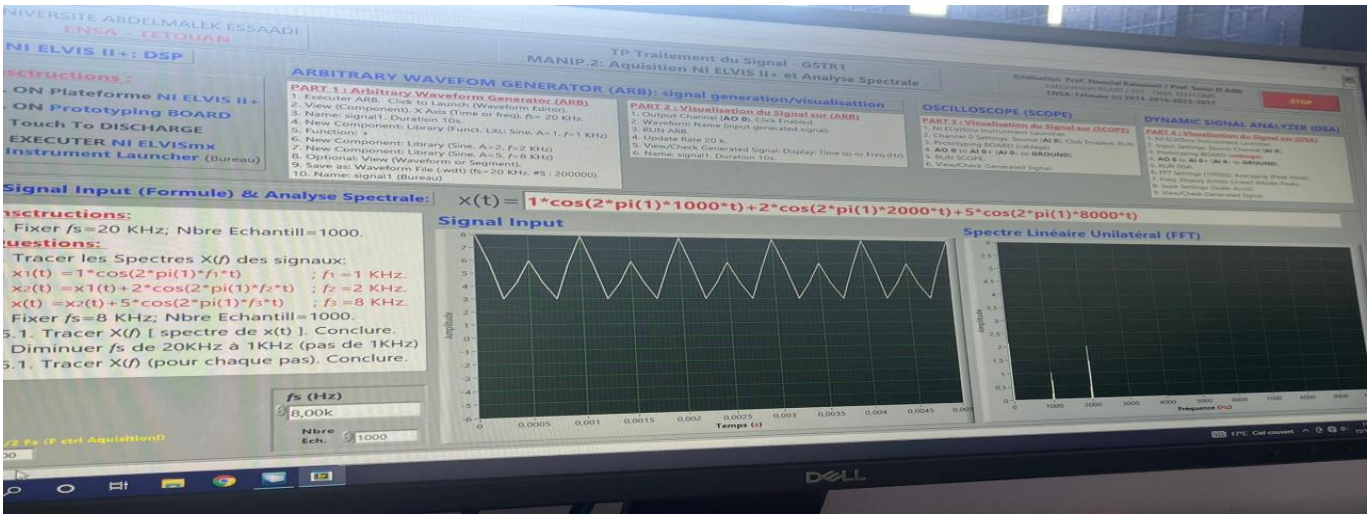
Fs=10 khz :



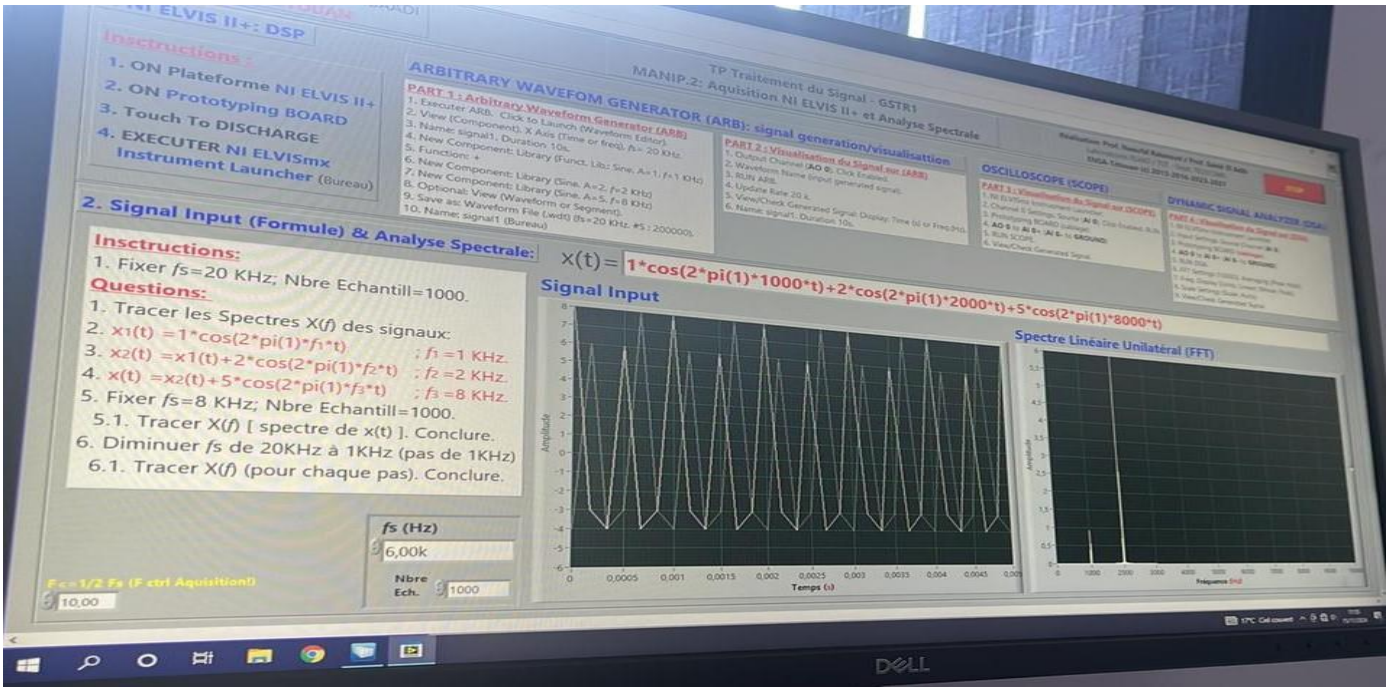
Fs=9 khz :



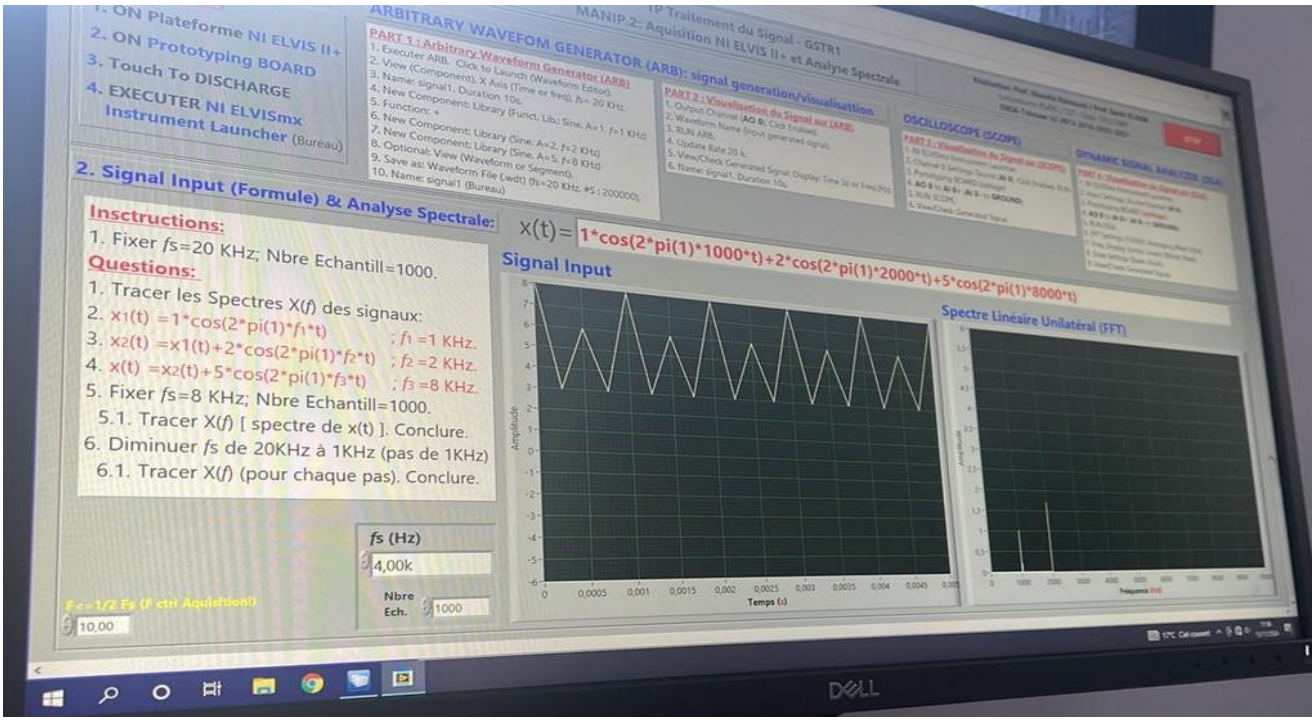
Fs= 8khz :



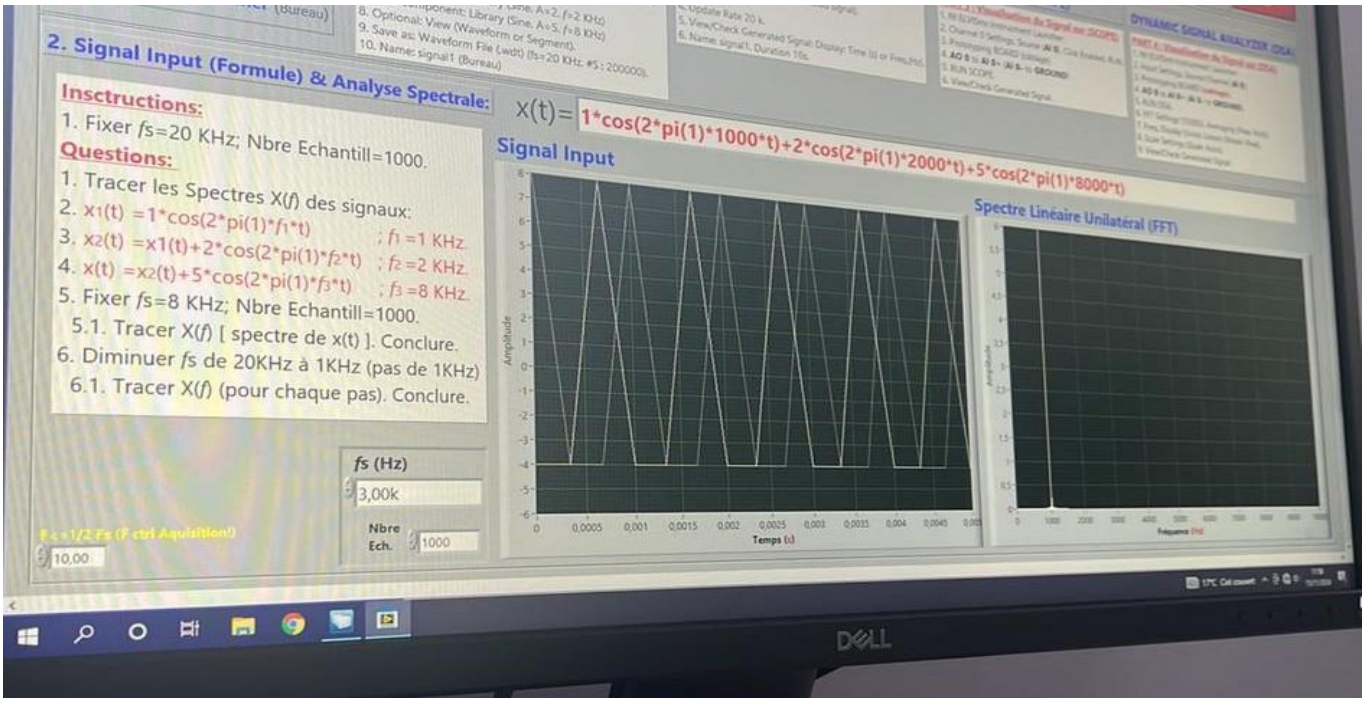
Fs=6 khz :



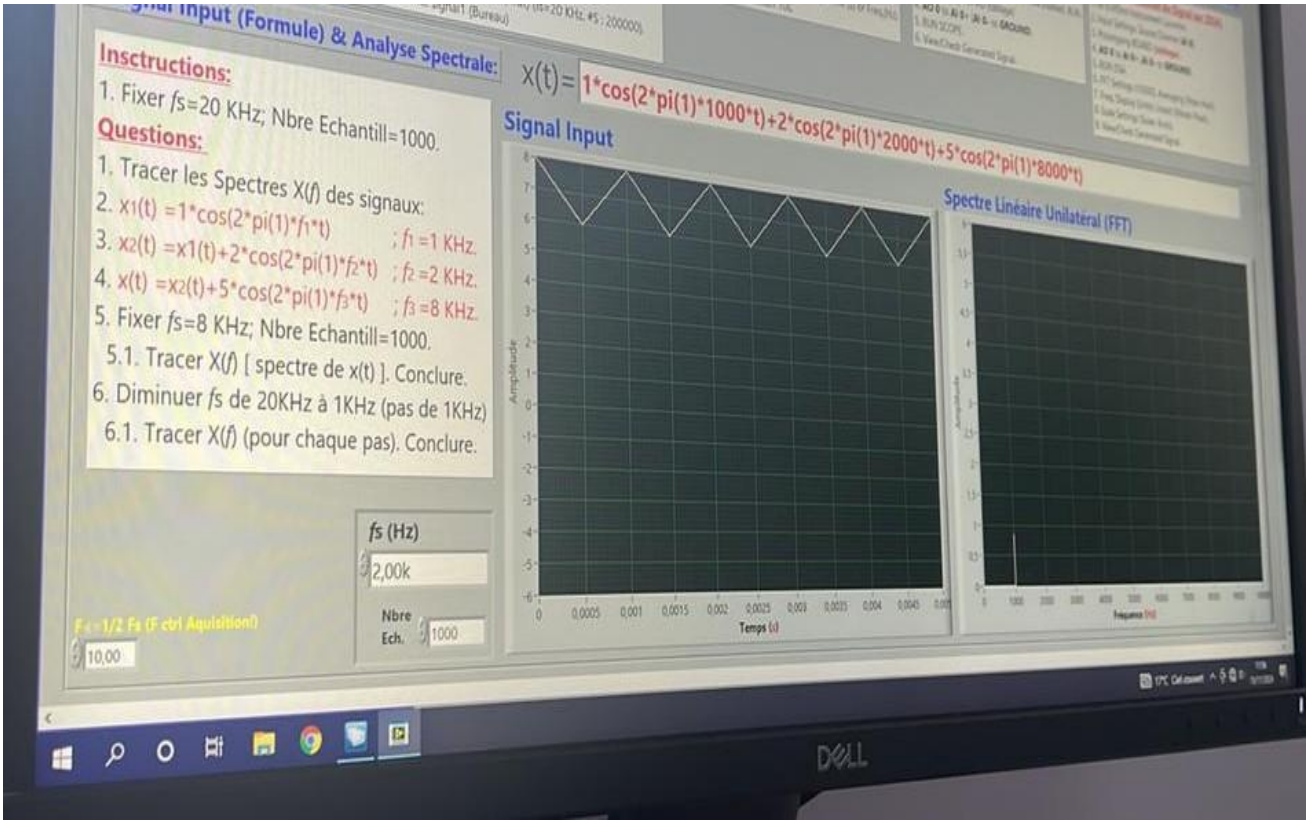
Fs=4 khz :



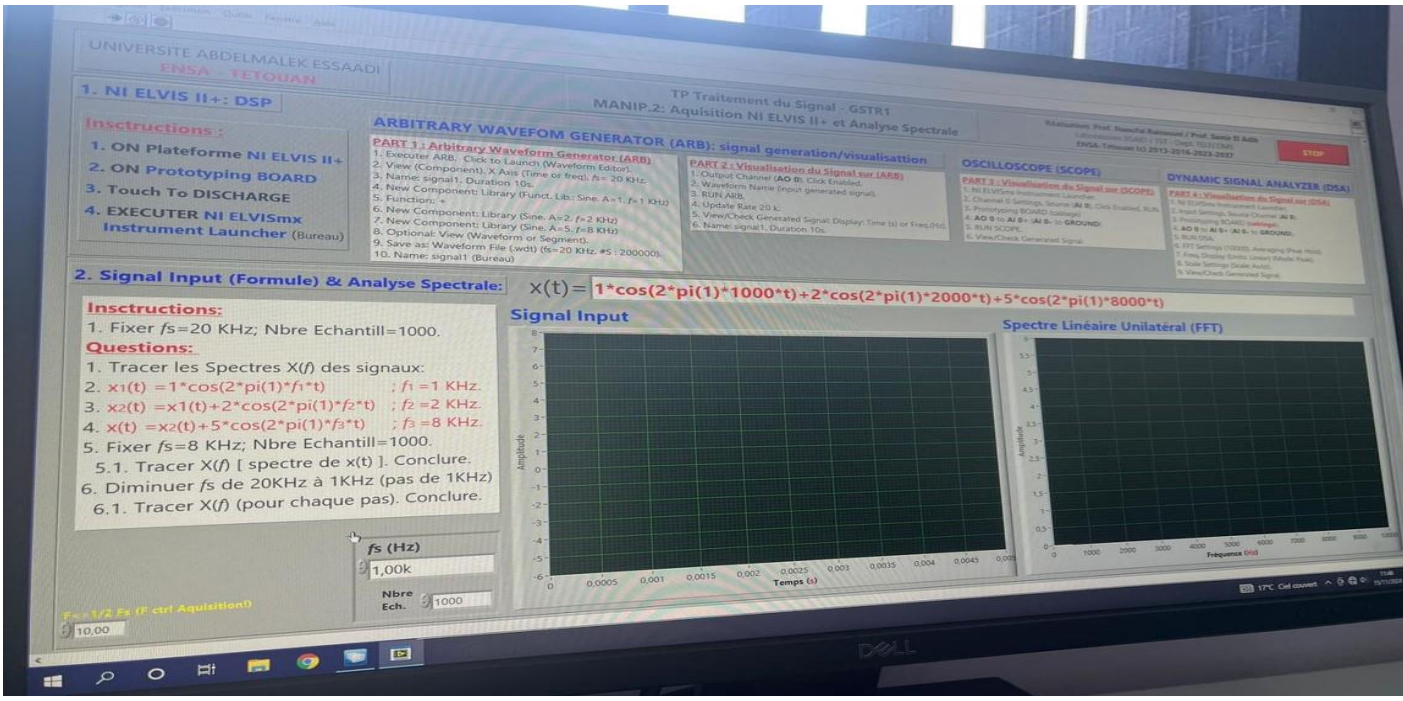
Fs=3khz :


2. Signal Input (Formule) & Analyse Spectrale:
Insctructions:
1. Fixer fs=20 KHz; Nbre Echantill=1000.
Questions:
1. Tracer les Spectres X(f) des signaux:
2. x1(t) =1*cos(2*pi(1)*f1*t) ; f1 =1 KHz.
3. x2(t) =x1(t)+2*cos(2*pi(1)*f2*t) ; f2 =2 KHz.
4. x(t) =x2(t)+5*cos(2*pi(1)*f3*t) ; f3 =8 KHz.
5. Fixer fs=8 KHz; Nbre Echantill=1000.
5.1. Tracer X(f) [spectre de x(t)]. Conclure.
6. Diminuer fs de 20KHz à 1KHz (pas de 1KHz)
6.1. Tracer X(f) (pour chaque pas). Conclure.
X(t)= 1*cos(2*pi(1)*1000*t)+2*cos(2*pi(1)*2000*t)+5*cos(2*pi(1)*8000*t)
Signal Input
Spectre Linéaire Unilatéral (FFT)
fs (Hz)
3,00k
Nbre Ech.
1000
10,00
Amplitude
Temps (s)
DELL

Fs= 2khz :


Insctructions:
1. Fixer fs=20 KHz; Nbre Echantill=1000.
Questions:
1. Tracer les Spectres X(f) des signaux:
2. x1(t) =1*cos(2*pi(1)*f1*t) ; f1 =1 KHz.
3. x2(t) =x1(t)+2*cos(2*pi(1)*f2*t) ; f2 =2 KHz.
4. x(t) =x2(t)+5*cos(2*pi(1)*f3*t) ; f3 =8 KHz.
5. Fixer fs=8 KHz; Nbre Echantill=1000.
5.1. Tracer X(f) [spectre de x(t)]. Conclure.
6. Diminuer fs de 20KHz à 1KHz (pas de 1KHz)
6.1. Tracer X(f) (pour chaque pas). Conclure.
X(t)= 1*cos(2*pi(1)*1000*t)+2*cos(2*pi(1)*2000*t)+5*cos(2*pi(1)*8000*t)
Signal Input
Spectre Linéaire Unilatéral (FFT)
fs (Hz)
2,00k
Nbre Ech.
1000
10,00
Amplitude
Temps (s)
DELL

Fs= 1khz :



- <u>Conclusion</u> :

Un échantillonnage à 8 kHz engendre un aliasing, où la composante à 8 kHz se replie et apparaît à 0 kHz.

IBTISSAME MEGHRAOUI

HIBA NAHRI

OUSSAMA NOR