EA106 Communications electronics Practical work

1. TP1: Introduction to amplitude modulation

Goals :

- Size a simulation environment
- Display a signal in the time and frequency domain
- Illustrate the course on amplitude modulations

1.1. Function generation and visualization

- o Generate the signal modulant(time)=Amodulant.cos (2p.fmodulant.time) with fmodulant=1kHz and Amodulant=1.
- o Visualize the modulating signal (time) and the FFTmodulating spectrum (frequencies).
- o Generate the signal carrier(time)= Aporteuse.cos (2p.fporteuse.time) with fcarrier=10kHz and Carrier=1.
- o Report one of the two signals in its time and frequency form.

1.2. Generation of an amplitude modulated signal

- o Multiply the two previous signals to create the modulated signal signalmodule(time).
- o Visualize signalmodule(time) and FFTSignal_module(frequencies).
- o Report the signal in its time and frequency form. o What type of modulation is carried out?

1.3. Comments

- o Vary the carrier frequency (fcarrier=100kHz).
- o Vary the frequency of the modulating signal (fmodulant=5kHz) and the amplitude and Amodulant=5.
- o Vary the shape of the modulating signal using a square wave with fmodulant=1kHz and Amodulant=1.
- o Report the 3 signals in their time and frequency form.

2. TP2: Introduction to angular modulation

Goals :

- Size a simulation environment
- Display a signal in the time and frequency domain
- Illustrate the course on angular modulations

2.1. Generation and visualization of a frequency modulated signal

- o Generate the signalmodule(time) signal modulated in frequency by a sinusoidal signal with fmodulant=1kHz, fcarrier=10kHz, index_ß=2 and Amodulant=1.
- o Report the signal in its time and frequency form. o What is the Carson band associated with this signal?

2.2. Comments

- o Vary the carrier frequency (fcarrier=100kHz). o Vary the frequency of the modulating signal (fmodulant=5kHz, Amodulant=1) then the amplitude (Amodulant=5, fmodulant=1kHz).
- o How does the Carson gang evolve during these changes?

2.3. Generation and visualization of a phase modulated signal

- o Propose generation and visualization of a phase modulated signal. o Report the signal in its time and frequency form. Compare with a frequency modulated signal.