Arab Academy for Science and Technology & Maritime Transport
College of Engineering & Technology
Electronics and Communications Dep.

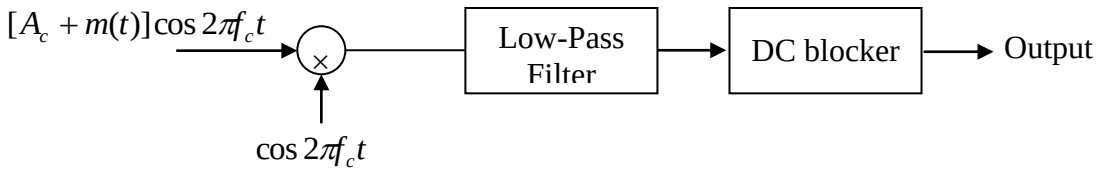
5th term Electronics & Communications
EC321- Communication Theory

Lecturer: Prof. Ehab F. Badran - Dr. Mohamed Tamazin
GTA: Eng. Alaa Allah El Sabaa

Sheet # 4

1. **Write an expression for the DSB-TC s(t), for the baseband signal** $m(t)= A_m\cos(2\pi f_m t)$ **and a carrier of** $c(t)= A_c\cos(2\pi f_c t)$ **then sketch s(t).**

2. **The system shown below shows a scheme for coherent (synchronous) AM demodulation. Show that this demodulator can demodulate the AM-DSB-TC** $\varphi_{AM}(t)=[A_c+m(t)]\cos 2\pi f_c t$ **regardless of the value of** A_c**. (regardless of the value of** μ**).**



3. **Two Signals** $x_1(t)$ **and** $x_2(t)$ **are applied to the system show in fig.1**

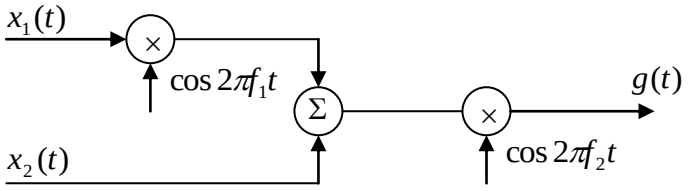


Fig. 1

   a. **Write an expression for** $g(t)$**, assuming that** $f_1 = 10kHz$ **and** $f_2 = 80kHz$**.**
   b. **Given** $g(t)$**, explain how you could recover** $x_2(t)$**.**

4. **For the following baseband signal :**

$$m(t) = \cos 2\pi 1000t$$

Sketch the spectrum of *m*(*t*) and the spectrum of the DSB-SC signal $m(t)\cos 2\pi 10^5 t$ **(Identify the LSB and the USB spectra).**