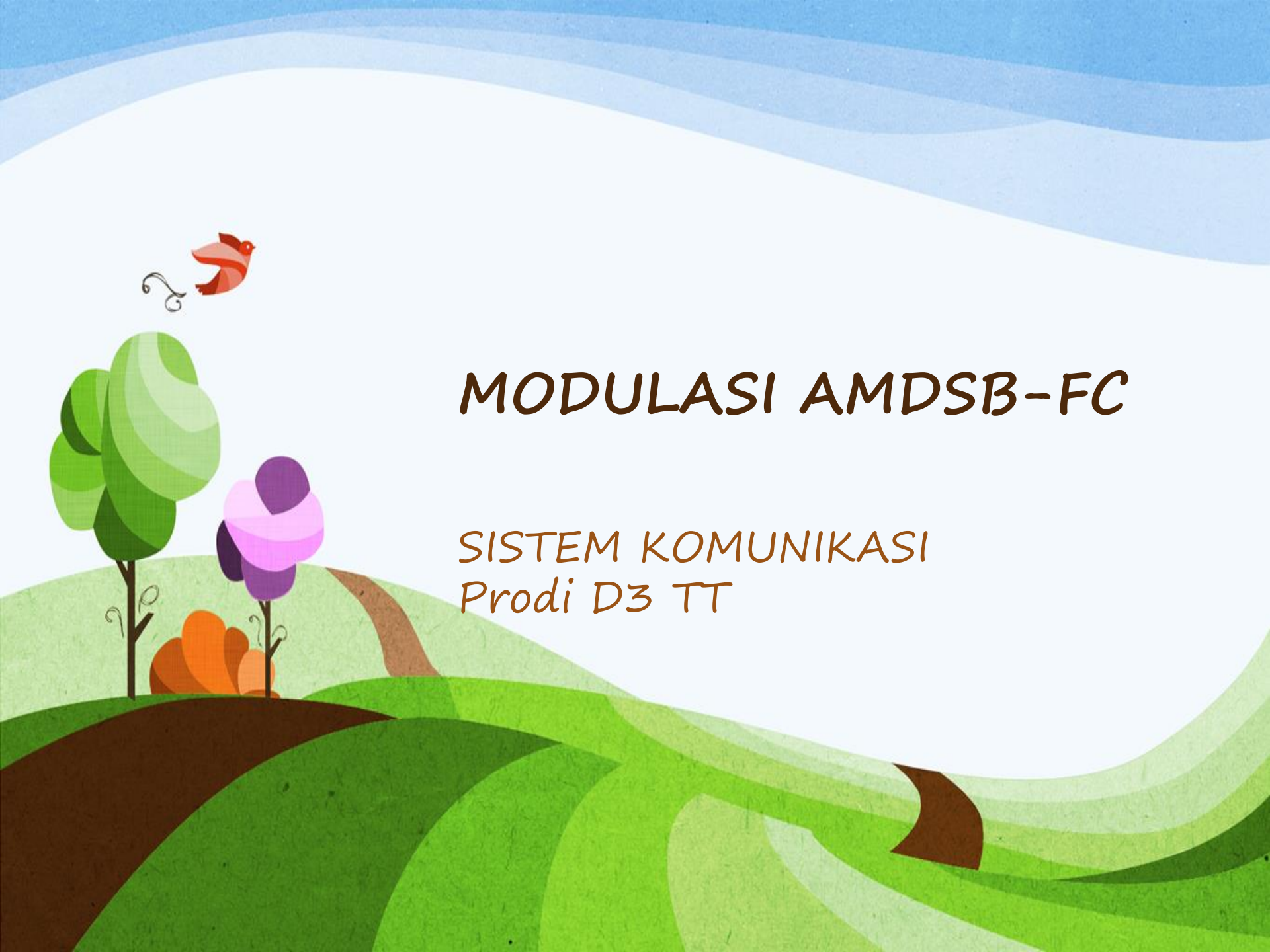
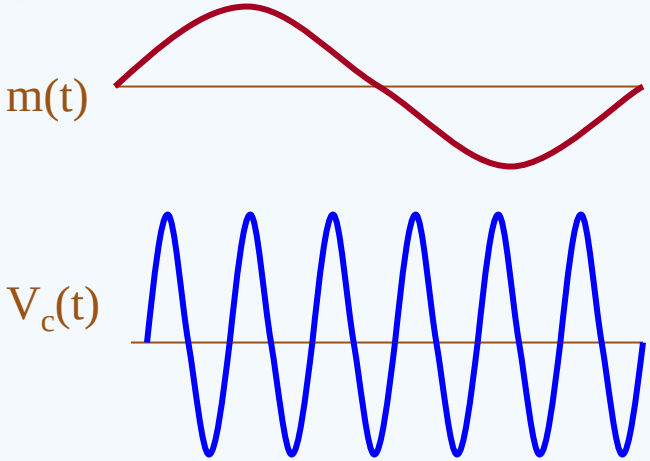


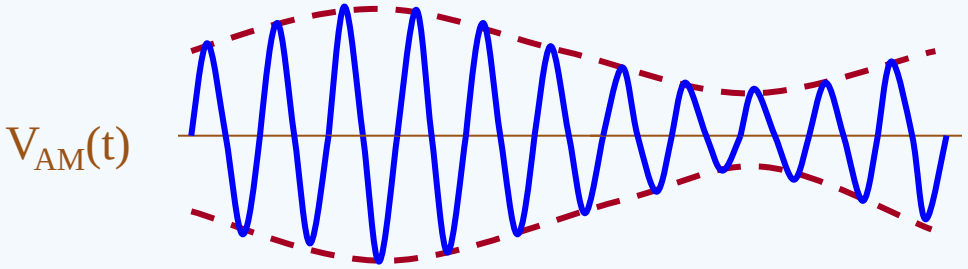
MODULASI AMDSB-FC

SISTEM KOMUNIKASI
Prodi D3 TT

Modulasi AM-DSB-FC

- Pembawa : $V_c(t) = V_c \cos(\omega_c t)$
- Pemodulasi : $m(t)$





$V_{AM}(t) = Vc\ [\ 1+ k_a\ m(t)\ ] \cos(2\pi f_c t)$

k_a = sensitivitas atau konstanta modulator AM [per volt]

$A(t) \triangleq Vc\ |\ 1+ k_a\ m(t)\ |$ = envelope sinyal AM

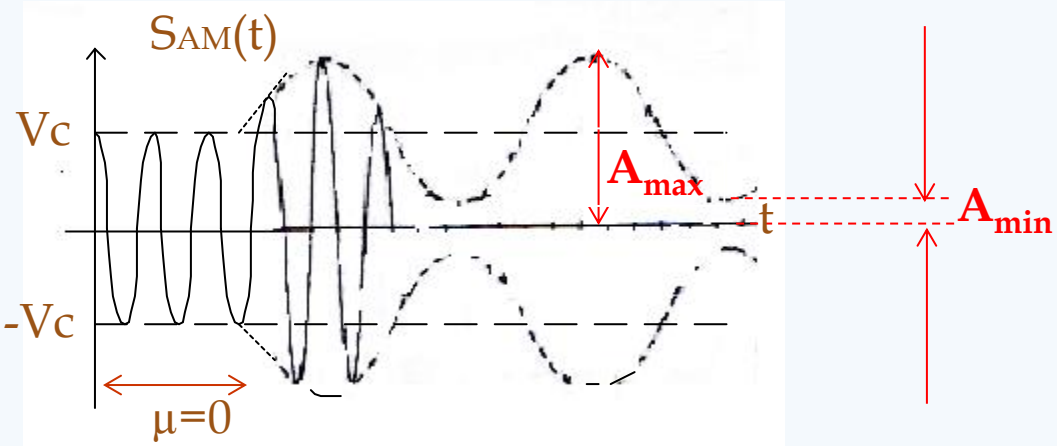
$|\ 1+ k_a\ m(t)\ | \leq 1$ $\rightarrow$tidak terjadi 'over modulasi'

AM DSB-FC, pemodulasi sinusoidal tunggal

$m(t) = V_m \cos 2\pi f_m t$

$V_{AM}(t) = V_c [1 + k_a V_m \cos 2\pi f_m t] \cos 2\pi f_c t$

$= V_c [1 + \mu \cos (2\pi f_m t)] \cos (2\pi f_c t)$, μ = indeks modulasi



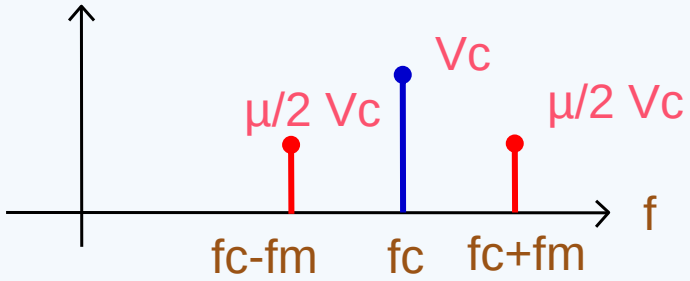
$$\mu = \frac{Amax - Amin}{Amax + Amin}$$

Spektrum AM DSB-FC, pemodulasi sinusoidal tunggal

$S_{AM}(t) = Vc\ [\ 1+\mu \cos(2\pi f_m t)]\cos(2\pi f_c t)$, μ = indeks modulasi

$S_{AM}(t) = V_c \cos(2\pi f_c t) + \mu/2\ Vc\ \cos 2\pi(fc+fm)t + \mu/2\ Vc \cos 2\pi(fc-fm)t$

Spektrum amplitudo sinyal AM-DSB-FC (pita 1 sisi)

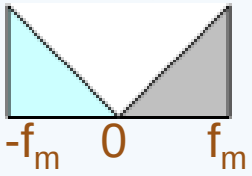


Perbandingan daya komponen carrier, komponen Upper sideband dan komponen Lower sideband

P_{LSB}	:	P_C	:	P_{USB}
$\frac{(\mu.V_C)^2}{8}$	:	$\frac{V_C^{\,2}}{2}$	:	$\frac{(\mu.V_C)^2}{8}$
$\frac{\mu^2}{4}$	:	1	:	$\frac{\mu^2}{4}$

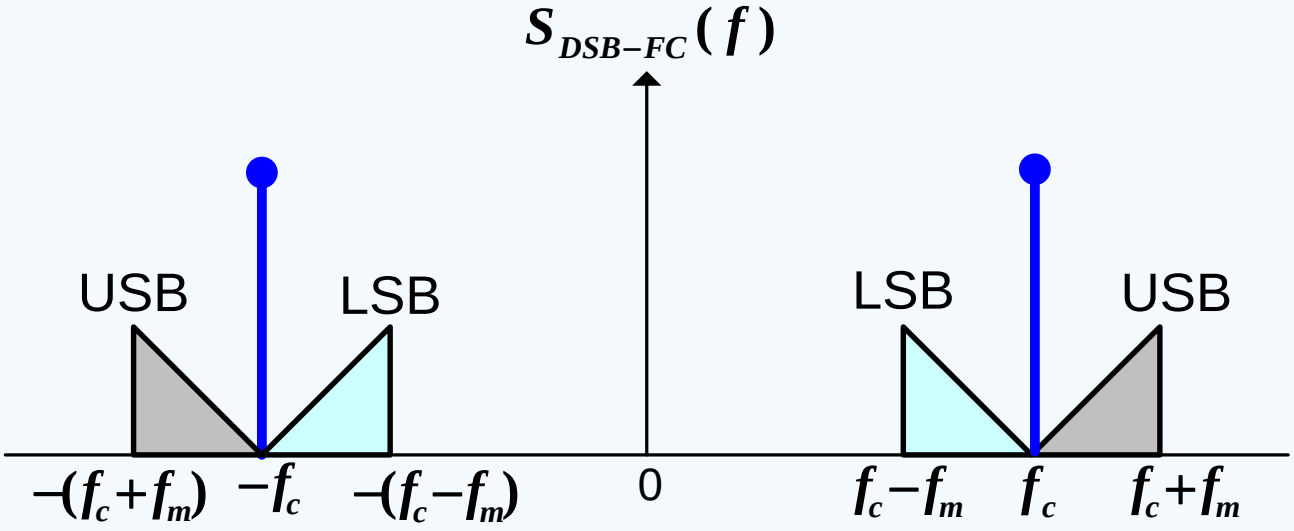
Spektrum AM DSB FC dengan informasi sinyal sembarang $m(t) \leftrightarrow M(f)$

- Spektrum $m(t)$ ➔ $M(f)$



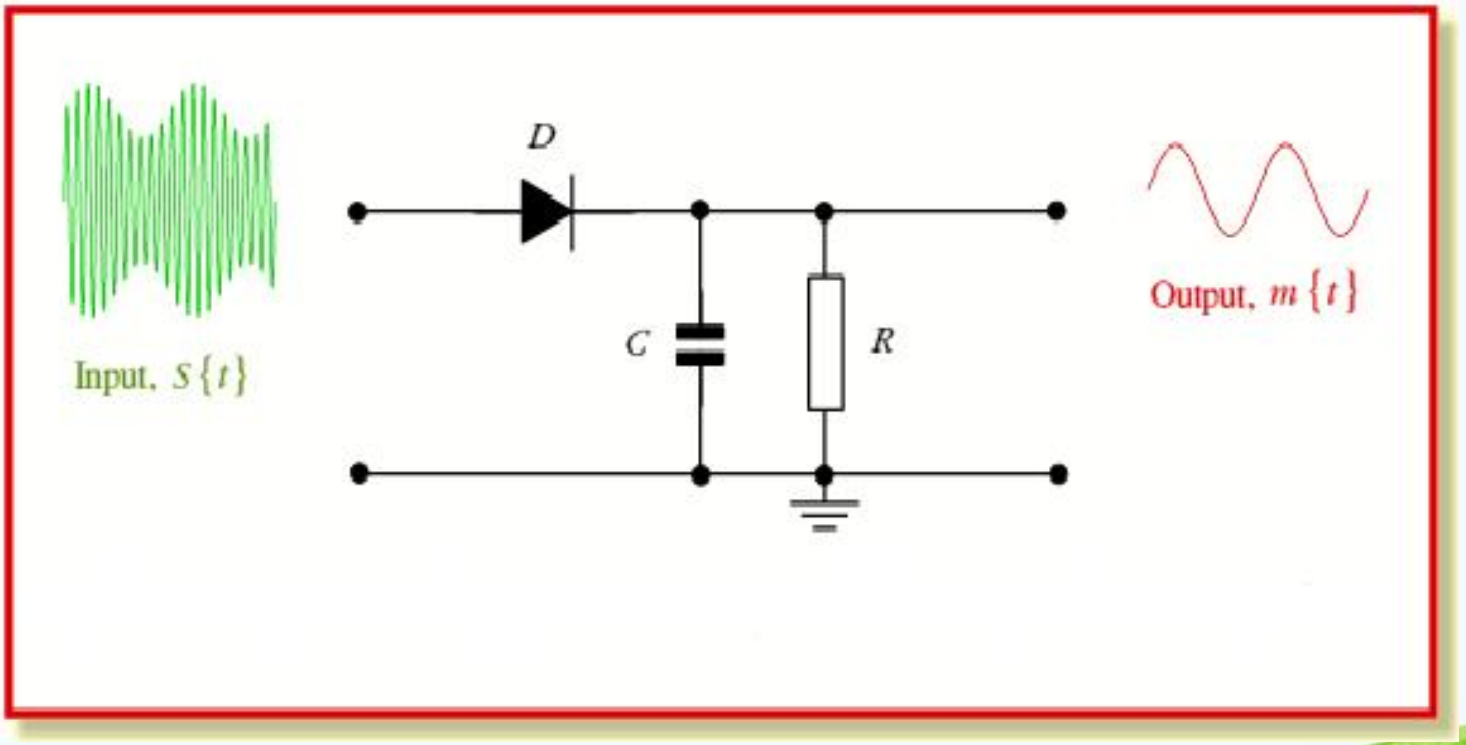
PITA DUA SISI

- Gambar Spektrum Sinyal DSB-FC

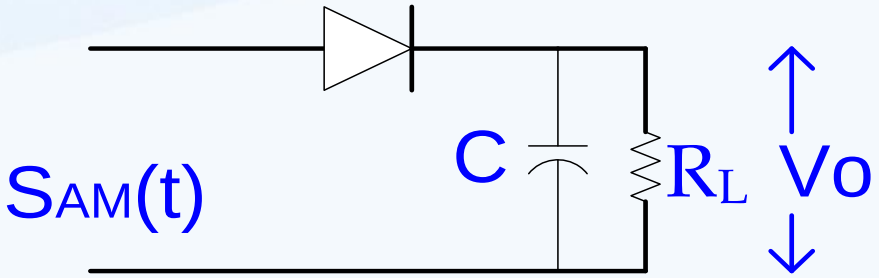


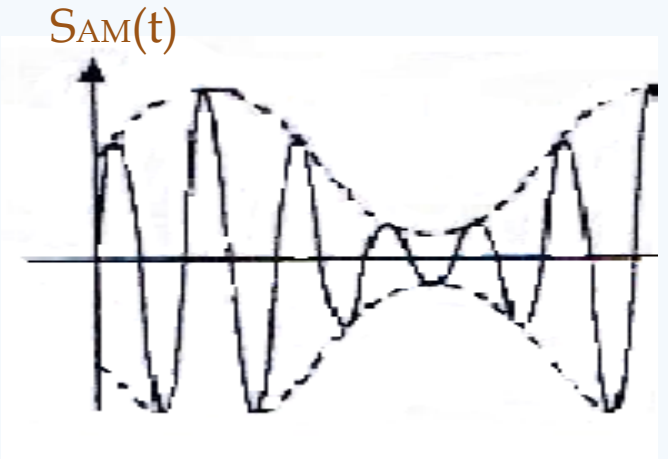
Demodulasi Sinyal AM-DSB-FC

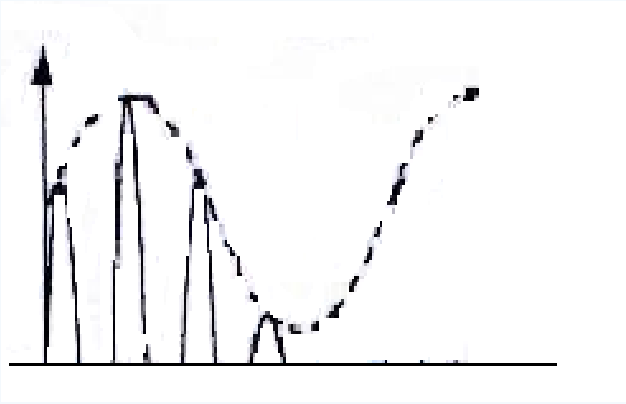
- Dilakukan dengan mendeteksi selubung (envelope) sinyal termodulasinya
- Alat yang digunakan disebut Detektor Selubung (Envelope Detector)

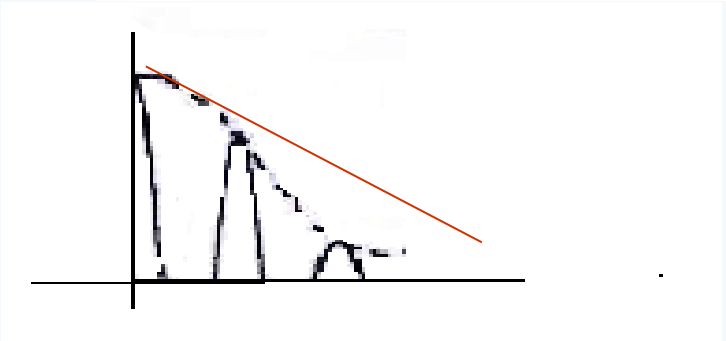


Detektor selubung







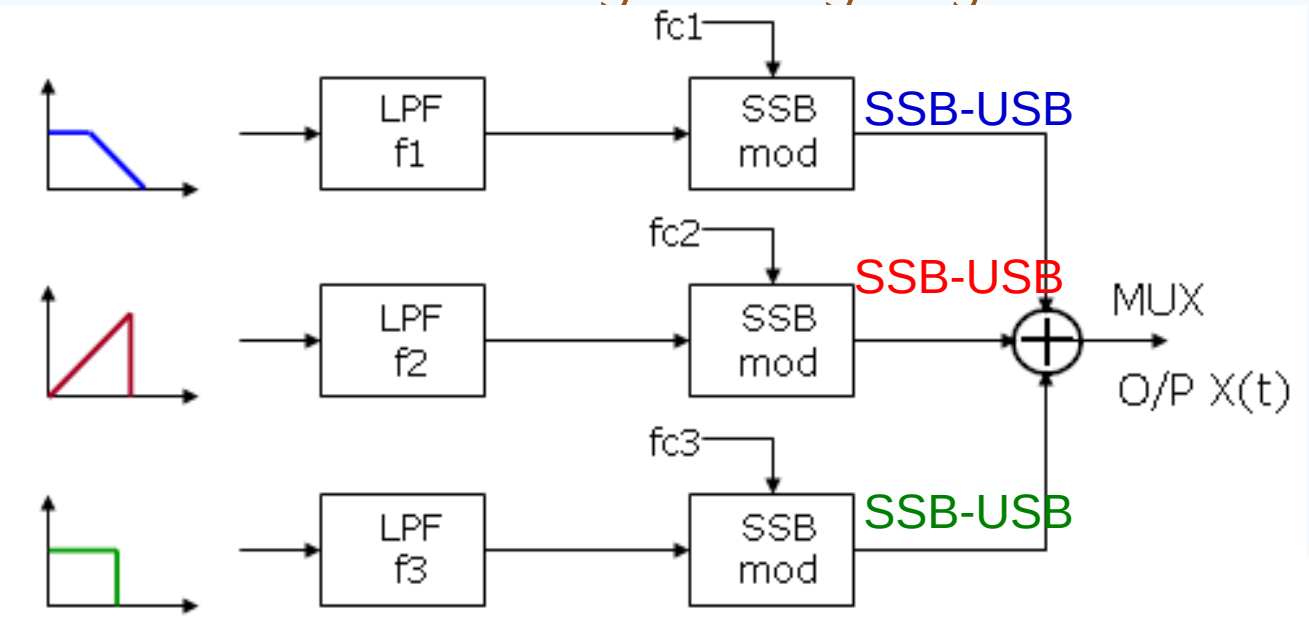


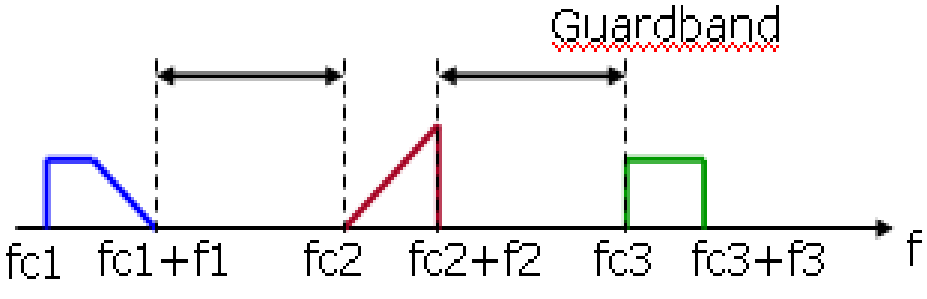
Syarat : $1/fc << R_L C << 1/W$, **W = Band Width dari m(t) =** f_m

Karena tdk memerlukan lokal osilator di penerima ➔ **non koherent detektor**

Frequency Division Multiplexing (FDM)

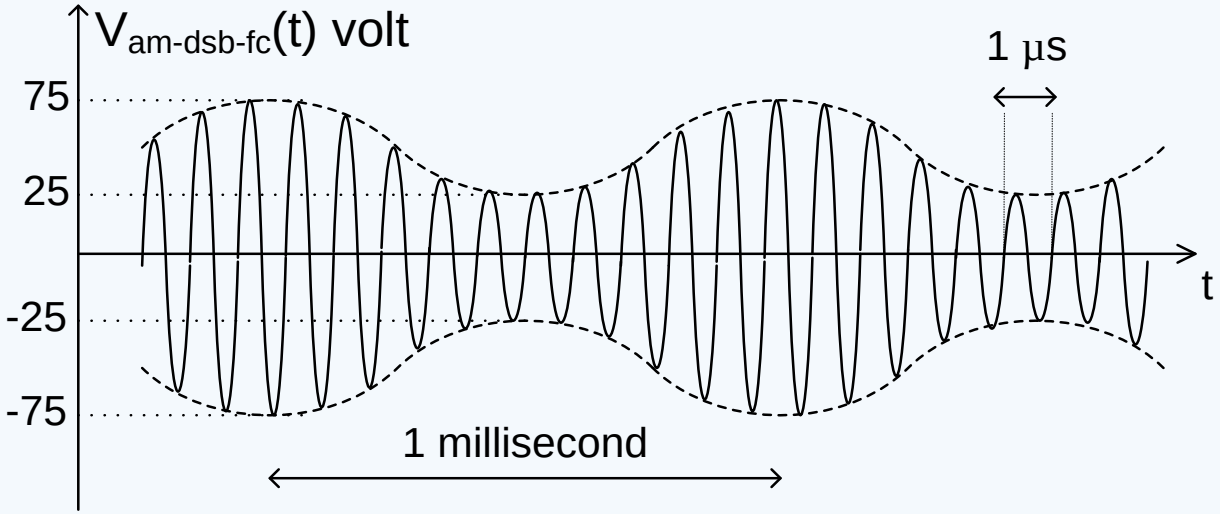
- FDM yaitu proses multiplexing sejumlah sinyal yang dibawa secara simultan dimana tiap sinyal dimodulasikan ke frekuensi carier yang berlainan, yang kemudian dibawa menuju media yang sama dengan cara mengalokasikan band frekuensi yang berlainan ke masing-masing sinyal.





Latihan soal:

1. Sinyal berikut merupakan sinyal keluaran modulator AM-DSB-FC



a) Hitung indeks modulasi **(m)** dan amplituda sinyal pembawa **(Vc)** !

b) Hitung frekuensi sinyal pemodulasi **(fm)** dan sinyal pembawa **(fc)** sinyal AM tersebut !

c) Tentukan persamaan gelombang sinyal AM tersebut **[$V_{AM\text{-}DSB\text{-}FC}(t)$]**

d) Gambarkan **spektrum daya satu sisi** (spektrum frekuensi dilengkapi levelnya)!

e) Hitung **daya rata-rata sinyal AM** tersebut dan perbandingan $P_C : P_{USB} : P_{LSB}$!

THANK U