

12/10

① 強度変調と②周波数変調をそれぞれ与えた場合のスペクトルの変化を計算した。

①

繰り返し周波数 Repetition rate(ω_r)の Oscillator 出力

$$I_r = A_r \cos \omega_r t$$

強度 A_r に変調を加えるので

$$A'_r = A_r (1 + \alpha) \cos \omega_a t$$

$$I'_r = A_r (1 + \alpha) \cos \omega_a t * \cos \omega_r t$$

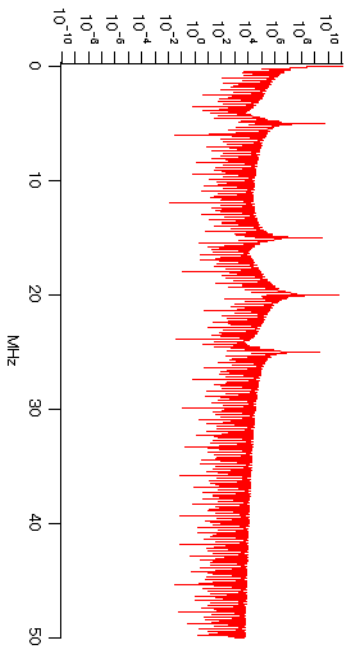
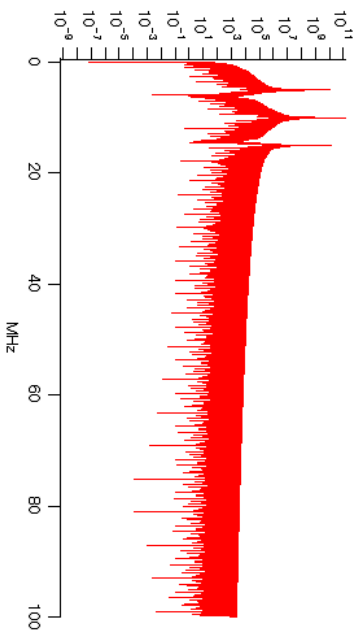
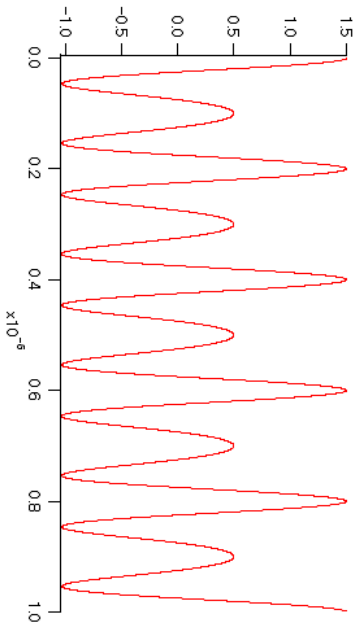
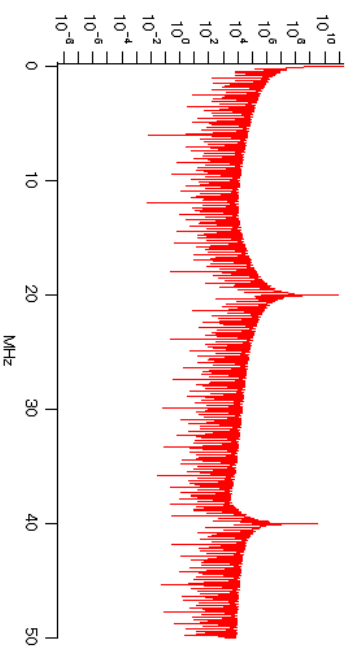
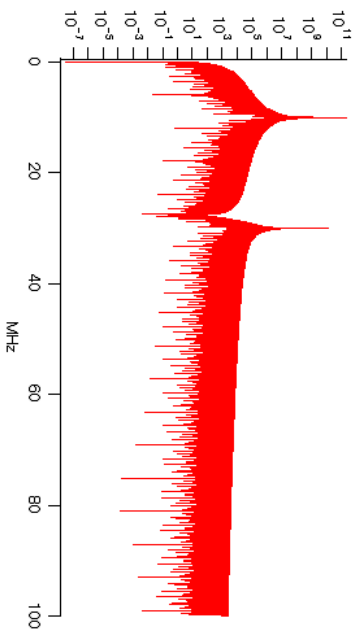
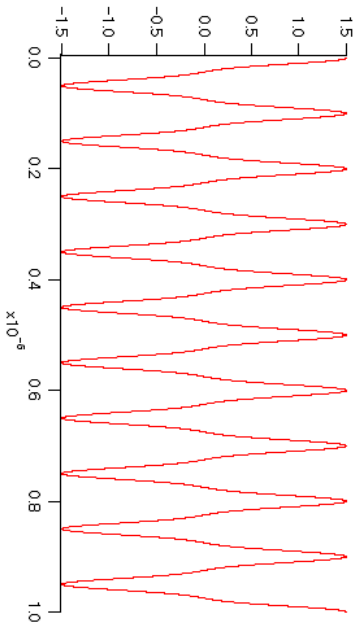
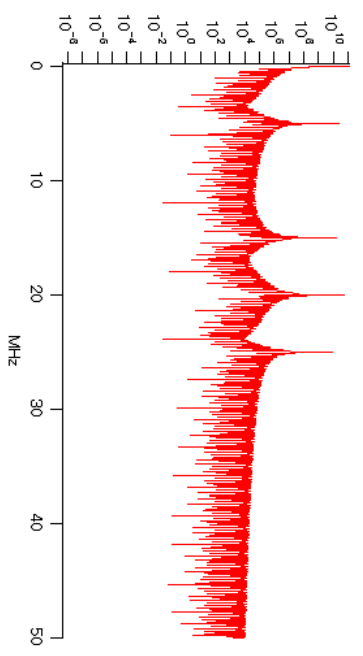
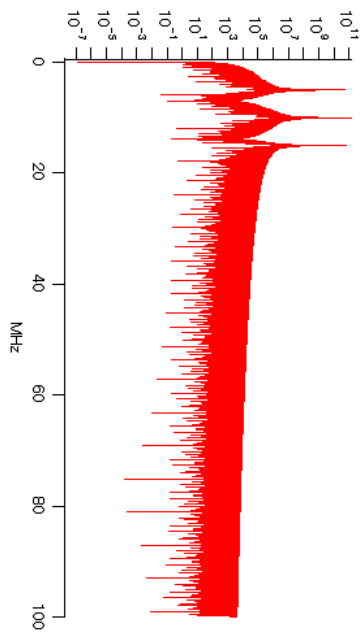
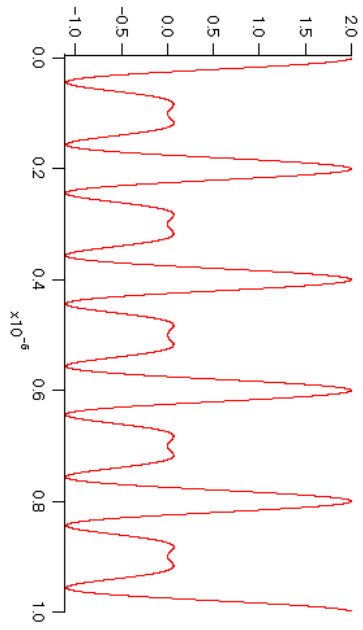
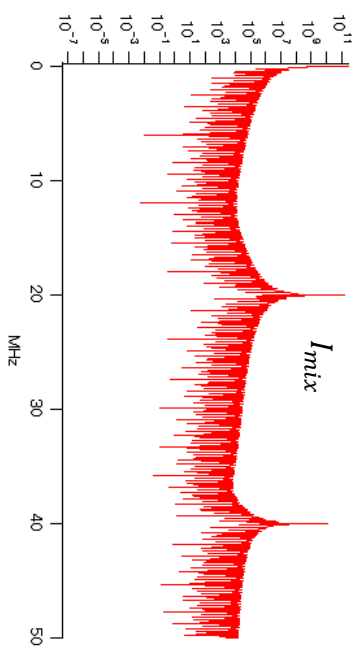
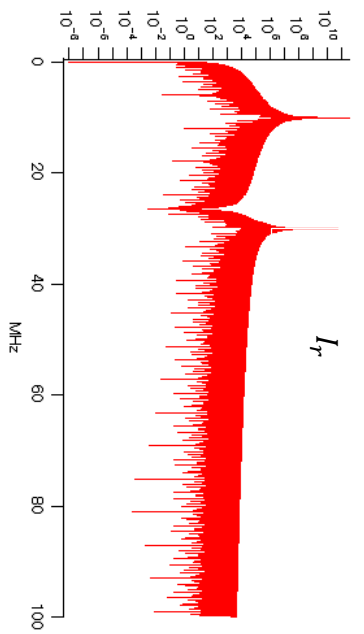
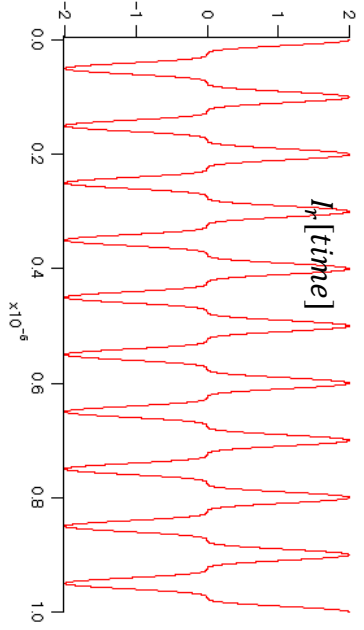
②

変調後の周波数

$$I_{mr} = A_r \cos \left[\omega_r t + \sum_i \frac{\bar{\omega}_{si}}{\omega_{si}} \sin(\omega_{si} t) \right]$$

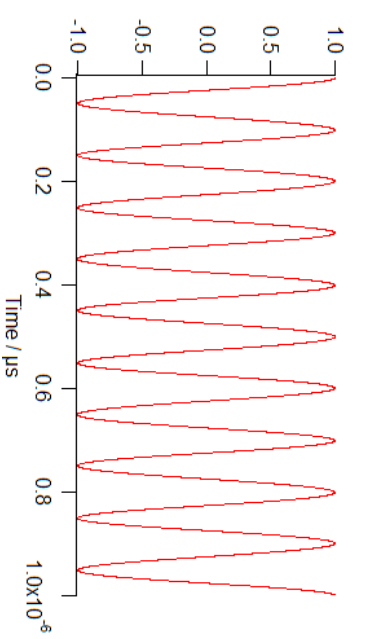
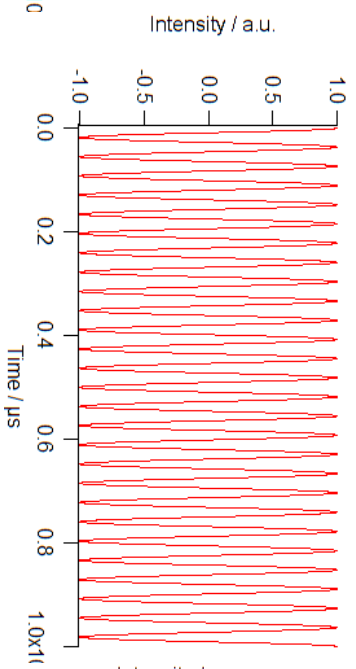
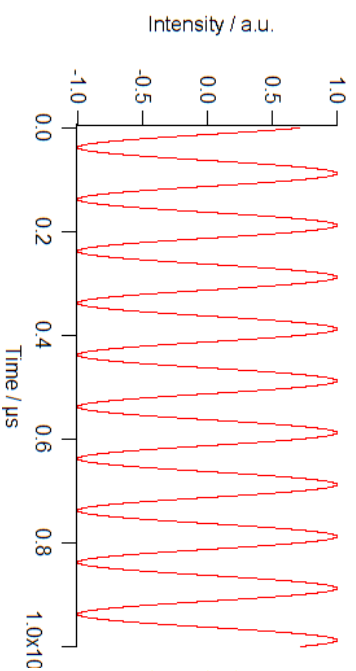
ミキサー後の周波数

$$I_{mix} = \frac{A_r A_{syn}}{2} \left[\cos \left\{ 2\omega_r t + \sum_i \frac{\bar{\omega}_{si}}{\omega_{si}} \sin(\omega_{si} t) + \varphi \right\} \right. \\ \left. + \cos \left\{ \sum_i \frac{\bar{\omega}_{si}}{\omega_{si}} \sin(\omega_{si} t) - \varphi \right\} \right]$$

$\alpha = 0.5$ $\omega_r = 5[\text{Mhz}]$  $\alpha = 0.5$ $\omega_r = 20[\text{Mhz}]$  $\alpha = 1$ $\omega_r = 5[\text{Mhz}]$  $\alpha = 1$ $\omega_r = 20[\text{Mhz}]$ 

左

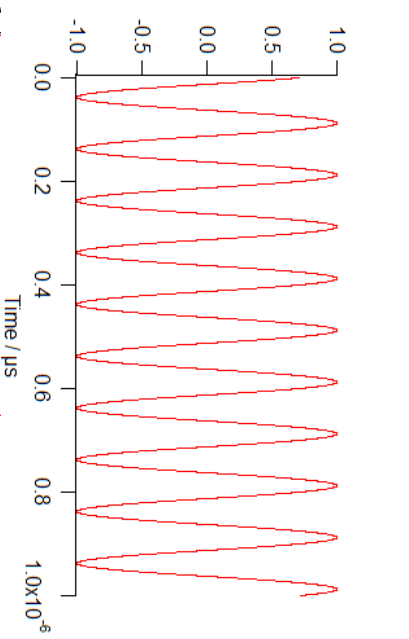
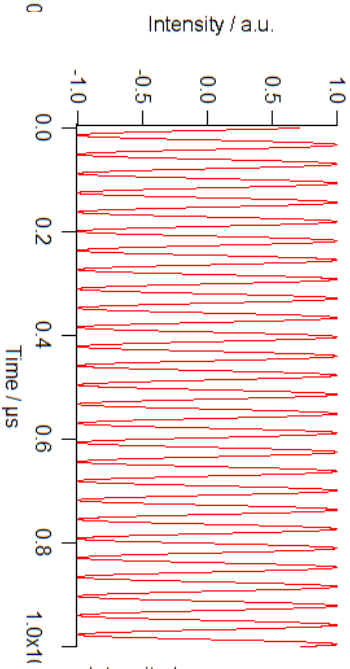
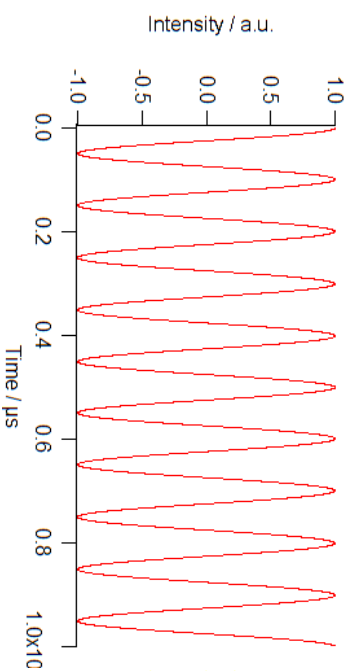
$\omega_r = 10[\text{Mhz}]$
 $\omega_s = 2[\text{Mhz}]$
 $\omega_{syn} = 10[\text{Mhz}]$
 $\bar{\omega}_s = 0.01\omega_s$



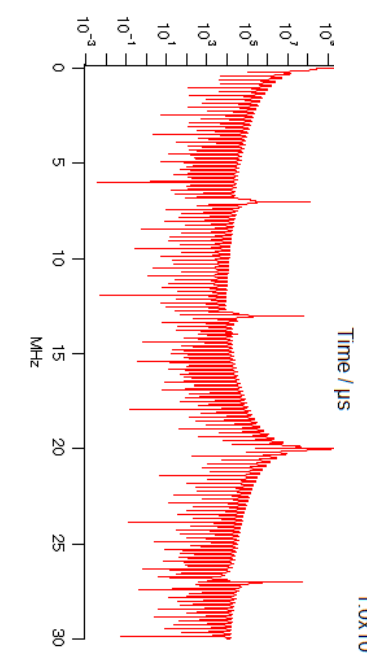
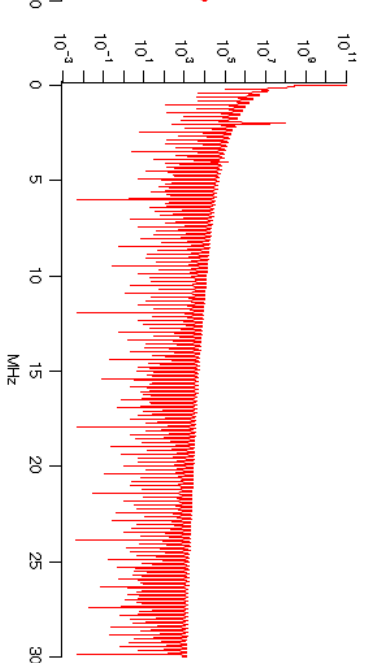
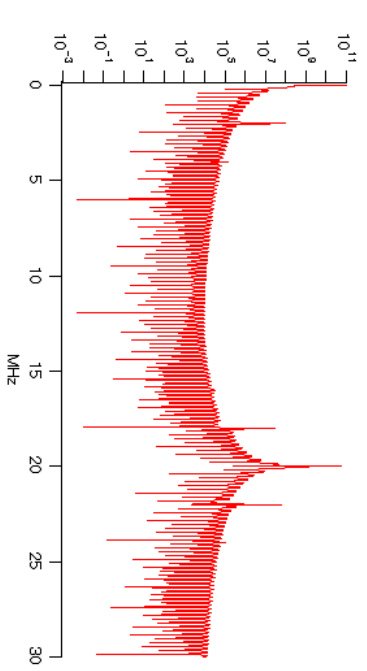
$Dx=4.898E-7$

中央

$\omega_r = 27[\text{Mhz}]$
 $\omega_s = 2[\text{Mhz}]$

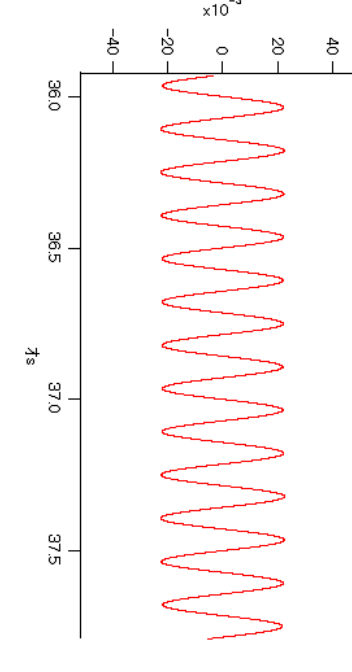
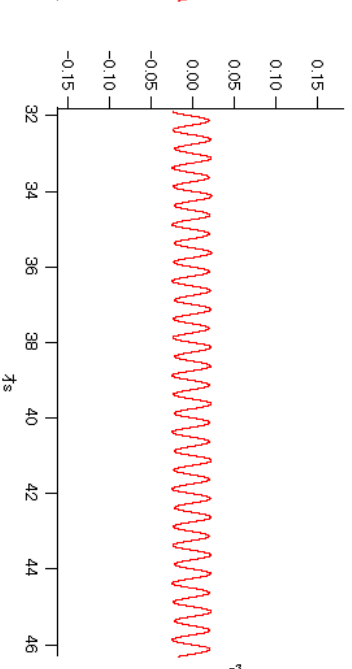
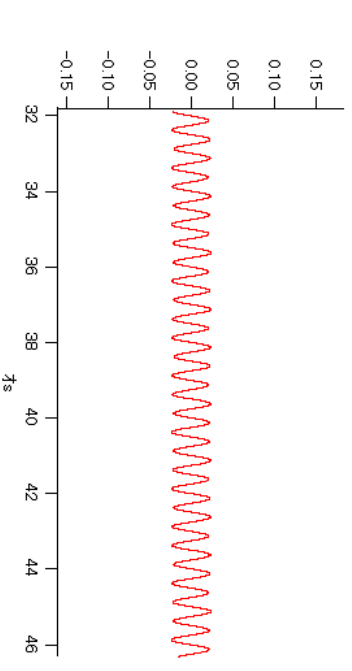


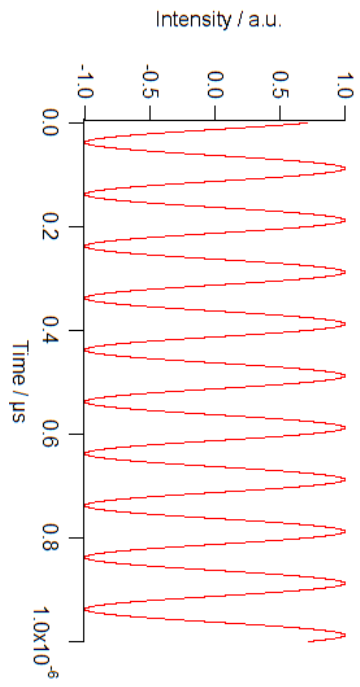
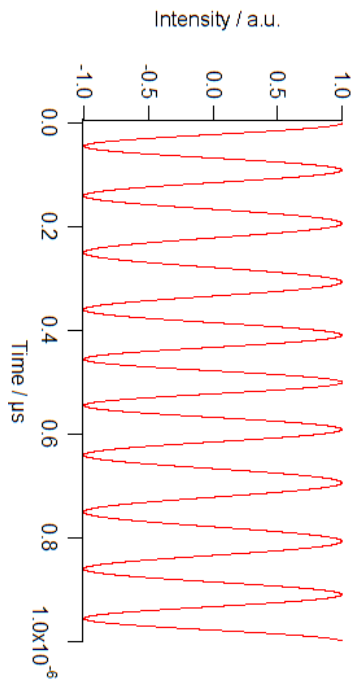
$\omega_{syn} = 27[\text{Mhz}]$
 $\bar{\omega}_s = 0.01\omega_s$
 $Dx=4.898E-7$



右

$\omega_r = 10[\text{Mhz}]$
 $\omega_s = 7[\text{Mhz}]$
 $\omega_{syn} = 27[\text{Mhz}]$
 $\bar{\omega}_s = 0.01\omega_s$
 $Dx=4.898E-7$





$\omega_r = 10[\text{Mhz}]$
 $\omega_s = 2[\text{Mhz}]$
 $\omega_{syn} = 10[\text{Mhz}]$
 $\bar{\omega}_s = 0.1\omega_s$
 $Dx=4.95E-7$

