

## Lec 12

$$x(t) = A_x (\sin(2\pi 4000t) + \cos(2\pi a_x t)) :$$

$$y(t) = A_y (\sin(2\pi a_y t) + \cos(2\pi b_y t)) : \begin{cases} 0 \leq a_x \leq 8 \text{ kHz} \\ 0 \leq b_x \leq 16 \text{ kHz} \end{cases}$$

What are the Nyquist rate and sampling period?

a)  $x(t)$ ? ;  $\frac{2\pi \cdot 8E3}{2\pi} = 8 \text{ kHz}$  frequency

$$8E3 \cdot 2 = 16 \text{ kHz sampling "}$$

b)  $y(t)$ ?  $16 \text{ kHz}$  : freq  
 $32 \text{ kHz}$  : Sampling

c)  $x(t) + y(t)$ ? How den største freq er  $16 \text{ kHz}$   
 $32 \text{ kHz}$  : Sampling

d)  $x(t) \cdot y(t)$ ?  $8E3 + 16E3 = \underbrace{24 \text{ kHz}}_{\text{Freq}}$ ,  $48 \text{ kHz}$  sampling period

e)  $A_x = 1$  and  $a_x = 8 \text{ kHz}$ , observe  $1 \text{ ms}$  at  $T=0$   
 $\frac{1}{16E3} = 62,5 \text{ ns}$

f)  $\frac{1E-3}{62,5E-6} = 16$  samples

Python<sup>TM</sup> og MATLAB<sup>TM</sup> i git "