ROGER HOWE

Course Overview

- EE 105 – new version
  - Prerequisite: EECS 40
  - *analog* integrated circuits + basic IC device models needed to design them
  - course incorporates a laboratory
- Related courses :
  - EE 130, 140, 141, 142

[RE-ENROLL ... ~~TELEBEARS~~]

THURSDAY 6:30 - 9:30

RTH OH — 485 CORY HALL

have @ eecs

M 10:30-12
Thurs 10:30-12
× 3-7263

↑ 4 hrs. until PS is due.

DISC TAs

JONATHAN CHOY
KEN DO
... WEB PAGE
↓
EE 105.

LAB TAs

BLAKE LIN
MOHAN DUNGA ...
→ blakelin@icor.berkeley.edu.

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497 CORY HALL (BSAC OFFICE)

BRAM OR JESSICA.

EE105 HANDOUTS.

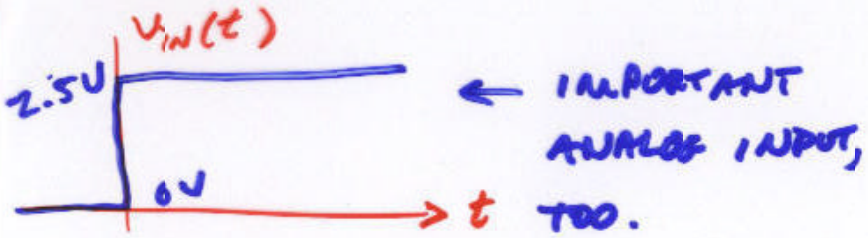
Sinusoidal Function Review

$$v(t) = V\cos(\omega t + \phi)$$

- V: amplitude (half of "peak-to-peak")
- ω: frequency (radian) ... $\omega = 2\pi f = 2\pi\,(1/T)$
- ϕ: phase (degrees or radians)

rads^{-1} ; f: Hz. $= \frac{1}{s}$.

EECS 40



← IMPORTANT ANALOG INPUT, TOO.

R. T. Howe

$45° = \frac{\pi}{4}$.

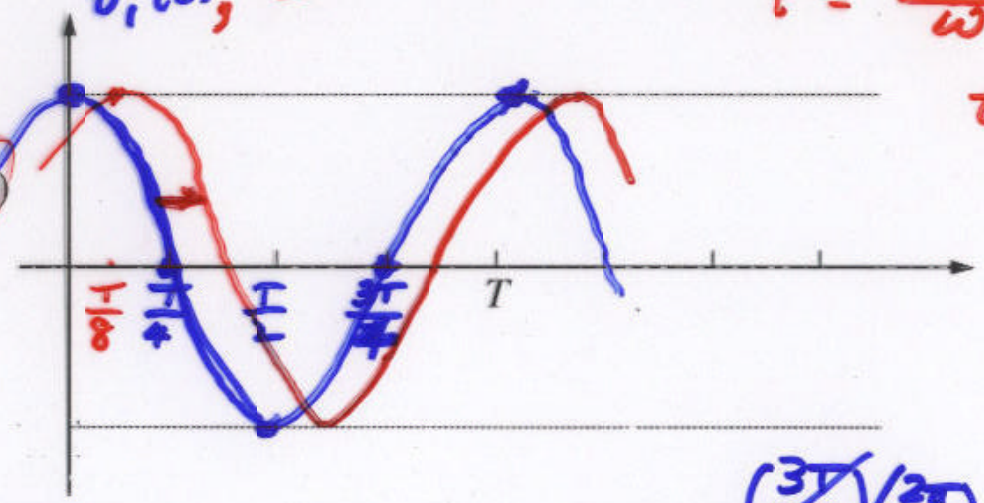
$\omega t' - 45° = 0$

Graphical Description

$v_1(t) = v\cos(\omega t)$

$v_2(t) = v\cos(\omega t - 45)$

$\omega = \frac{2\pi}{T}$



$\omega t' = 45° = \frac{\pi}{4}$

$t' = \frac{\pi/4}{\omega} = \frac{\pi/4}{2\pi/T}$

$t' = \frac{T}{8}$.

$\left(\frac{3\pi}{4}\right)\left(\frac{2\pi}{T}\right) = \frac{3\pi}{2}$

t	ωt	$\cos \omega t$
0	0	1
$T/4$	$\pi/2$	0
$T/2$	π	-1
$3T/4$	$\frac{3\pi}{2}$	0

$\omega = \frac{2\pi}{T}$

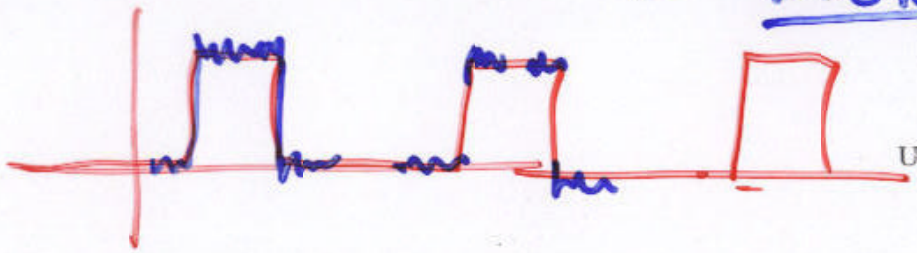
$\left(\frac{T}{4}\right)\left(\frac{2\pi}{T}\right) = \frac{\pi}{2}$

$\left(\frac{T}{2}\right)\left(\frac{2\pi}{T}\right) = \pi$

Why are Sinusoids Important?

- *Any* periodic signal $v(t)$ can be expressed as a sum of sinusoidal signals by a Fourier series expansion (EECS 20N, EE 120)
- The response of a linear circuit to a sinusoidal input, as a function of its frequency ω, leads to insights into the behavior of the circuit.

– DESIGNER –



WED TODAY 2→3:30

Linear Circuits

- *Theorem*: solutions for voltages and currents in a linear circuit (i.e., one consisting of R, L, C and dependent sources G_m, R_m, A_v, and A_i) with a *sinusoidal* signal as the input are:

ω

ω

OUTPUT: SINUSOIDS!

→ MODIFIED AMPLITUDE

↙ SHIFTED PHASE

EE 142