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-ENMCL...]
[TELZERHAS]

Thursday 6:30-9:30
RTH OH 485 Cory Hall
have DECCs

\[
\begin{align*}
M & \quad 10:30-12 \\
Tues & \quad 10:30-12 \\
\end{align*}
\]
\[\times \ 3-7263\]

4 hrs. until PS is due.

DISC TAS

Jonathan Choy
Ken Do

WEB PAGE

EE 105.

LAB TAS

Blake Lin
[Malcolm Dunca...]

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497 Cory Hall (BSAC Office)

Brain or Jessica.

EE105 handouts.
Sinusoidal Function Review

\[ v(t) = V \cos(\omega t + \phi) \]

- **amplitude**: (half of peak-to-peak)
- **frequency**: (radian) \( \omega = 2\pi f = 2\pi \left(1/T\right) \)
- **phase**: (degrees or radians)

**H_2**: \( \frac{1}{S} \)

**EECS 40**

*IMPORTANT ANALOG INPUTS TOO.*
Graphical Description

\[ v_1(t) = v \cos(\omega t) \]
\[ v_2(t) = v \cos(\omega t - 45) \]
\[ \omega = \frac{2\pi}{T} \]

\[ \omega t' = 45^\circ = \frac{\pi}{4} \]
\[ \omega t' - 45^\circ = 0 \]
\[ t' = \frac{\omega}{\omega} = \frac{t'}{t} \]
\[ t' = \frac{1}{8} \]

\[ \left( \frac{\pi}{4}, \frac{3\pi}{4} \right) = \frac{3\pi}{2} \]

\[ \left( \frac{3\pi}{4}, \frac{2\pi}{2} \right) = \frac{\pi}{2} \]

\[ \left( \frac{\pi}{4}, \frac{3\pi}{4} \right) = \pi \]

\[ \left( \frac{3\pi}{4}, \frac{2\pi}{2} \right) = \frac{\pi}{2} \]

<table>
<thead>
<tr>
<th>t</th>
<th>\omega t</th>
<th>\cos \omega t</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>T/4</td>
<td>\pi/2</td>
<td>0</td>
</tr>
<tr>
<td>T/2</td>
<td>\pi</td>
<td>-1</td>
</tr>
<tr>
<td>3T/4</td>
<td>3\pi/2</td>
<td>0</td>
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</tbody>
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Dept. of EECS

University of California at Berkeley
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 $\omega$, leads to insights into the behavior of the circuit.
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:

  - Output: Sinusoids!
  - Shifted phase
  - Modified amplitude