HW 2
non linear response
today: 2 poly process
last time

\[ V_x = V_0 \sin \omega t \]
\[ V_0 = \frac{C}{C_1 + C_2} \]
\[ V_x = \frac{1}{2} \left( 1 - \frac{t}{T_0} \right) V_x \]
\[ V_0 = -\frac{t}{yo} V_x \]

\[ V_1 \]
\[ V_2 \]
\[ V_3 \]
\[ V_4 \]
\[ V_5 \]

Superposition

\[ R \] of a capacitor is \( \frac{1}{j\omega C} \) in magnitude
(there is phase)

\( C = 1 \mu F \)
\( \omega = 1 \) kHz

\[ |Z_C| = \frac{1}{10^7 10^{-12}} = 10^5 \] 1 \mu F

\[ \omega = 10^8 \]
\[ |Z_C| = \frac{1}{10^9 10^{-12}} = 10^3 \] 1 kHz
ADXL-50, 1992

Frequency response - resonance freq.
\[ \omega_n = \sqrt{\frac{k}{m}} = \sqrt{\frac{1.7 \text{ N/m}}{10^{-9} \text{ kg}}} = \sqrt{1.7 \times 10^8} \text{ rad/s} \]
\[ = 4 \times 10^4 \frac{\text{rad}}{\text{s}} = 40 \text{ kHz} = 6 \text{ KHz} \]
Single mask makes routing very painful
Single material, structured layer restricting
surface area making

Deposition: Low Pressure Chemical Vapor Deposition (LPCVD)
Polar crystalline silicon, LPCVD poly is conformal
RIE - reactive ion etch, anisotropic-vertical sidewalls

Bone wafers
2um LPCVD SiO₂ / Contact
RIE etch oxide
2um LPCVD poly / PLI
RIE etch poly
HF etch oxide 100% overlap

Rounded
after ± 0.5um poly
Square