EE C247B – ME C218
Introduction to MEMS Design
Spring 2017

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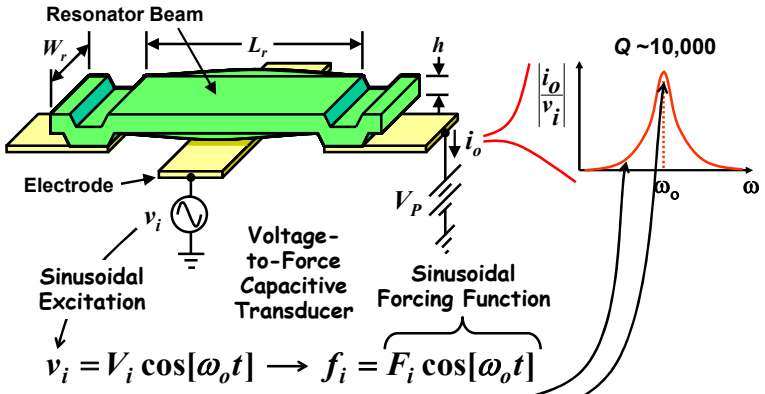
Lecture Module 10: Resonance Frequency

Lecture Outline

- Reading: Senturia, Chpt. 10: §10.5, Chpt. 19
- Lecture Topics:
  - Estimating Resonance Frequency
  - Lumped Mass-Spring Approximation
  - ADXL-50 Resonance Frequency
  - Distributed Mass & Stiffness
  - Folded-Beam Resonator

Estimating Resonance Frequency

Clamped-Clamped Beam μResonator



$$v_i = V_i \cos[\omega_o t] \longrightarrow f_i = F_i \cos[\omega_o t]$$

- $\omega \neq \omega_o$: small amplitude
- $\omega = \omega_o$: maximum amplitude → beam reaches its maximum potential and kinetic energies