

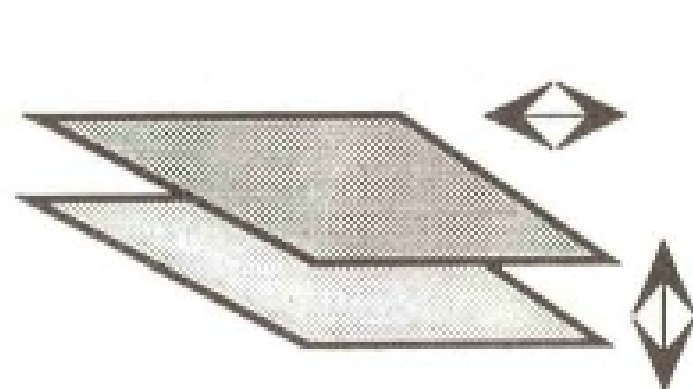
Accelerometers

- Capacitive Position Sensing
- Circuits for Capacitive Sensing
- ADI Capacitive Accelerometers
- Other MEMS Accelerometers

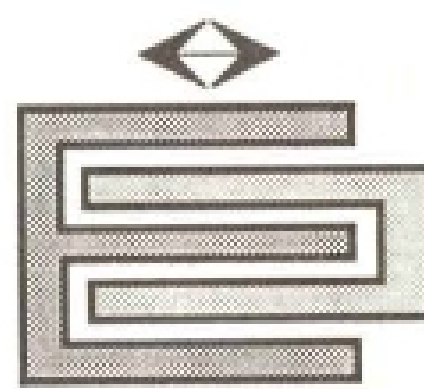
 Reading: Senturia, Chapter 19, p.497-530

Note: Most of figures in this lecture are copied from Senturia, *Microsystem Design*, Chapter 19.

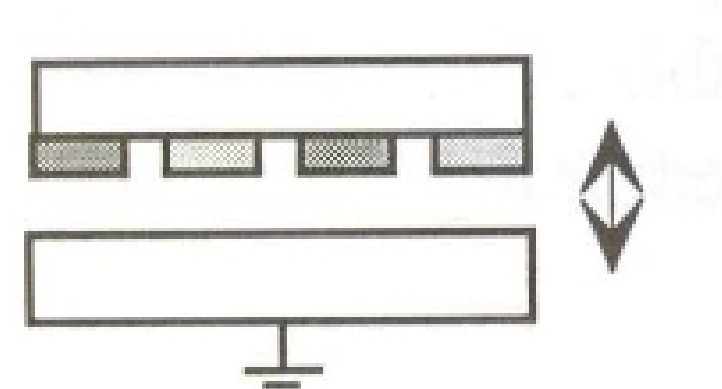
- **Capacitive Position Sensing**



Parallel Plate



Interdigital

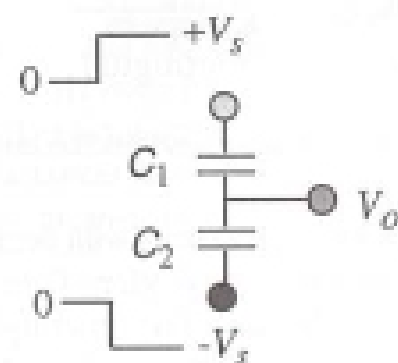
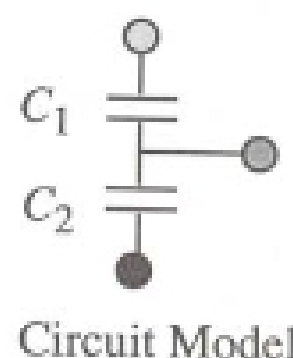
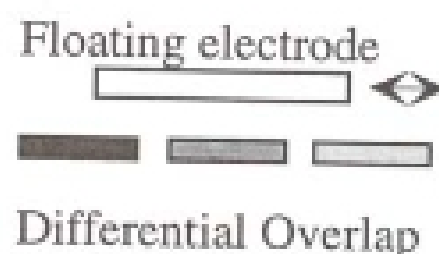
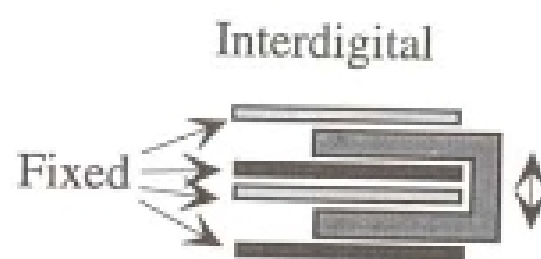
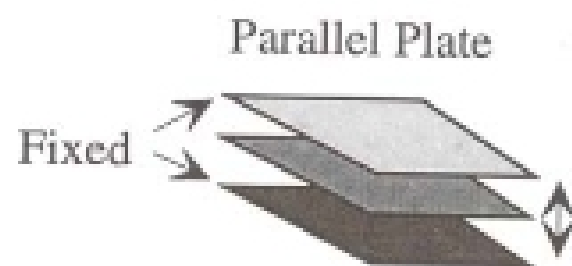


Fringing

MEMS Capacitive Sensors:

- High impedance
- Small sensing capacitance
- Very small signal
- Parasitic capacitance
- Noise

Differential Capacitive Sensing



$$V_o = -V_s + \frac{C_1}{C_1 + C_2} (2V_s)$$

$$= \frac{C_1 - C_2}{C_1 + C_2} V_s$$

- Differential Capacitive Sensing
 - First order cancellation of many effects
 - Temperature variations
 - Common mode rejection