Exercise 7.3-1

All Quick Questions to

7. Si MEMS

Products and Developments

- How large is the resistance of a **1 pF** capacitor at **10 GHZ**?
- Consider that the layer of whatever it is that forms the cantilever in the picture above would be under tensile stress in its top part (maybe the cantilever consists of two different materials stacked on top of each other). What would happen?
- Calculate Δ**R/R** for a rectangular piece of material with length ***l***, width ***w***, thickness ***t*** and specific resistivity ρ that is strained by ϵ in ***l***-direction.
- Give examples of **MEMS** products, their working principles and raneg of applications.
- Describe the working principle of a **DLP** beamer. Consider strengths and problems.
- Describe the working prinicple of a **MEMS** gyro. Provide a rough sketch of a possible implementation.
- Describe possibilites for inducing and detecting mechanical movment in a **MEMS** device.
- Compare a gyro or acceleration sensor operated around resonance or at lower than resoance frequencies. Give curves of amplitude and damping as a function of frequncy and discuss the role of damping.
- Give some pricnciples for making actors and compare the relative merits of the approach.

Processes and Specialities

- What is "stiction" and what role does it play in **MEMS** technology?