

OPTI 421/521 – Introductory Optomechanical Engineering

Homework 1

Assigned August 25,

due Sept. 3 for on campus students, Sept. 5 for off campus students

1) Writing assignment. I would like to learn about you, your background, and your goals. Please write about each of the following topics. **Please submit your write-up electronically.**

Introduce yourself

A few sentences about who you are, where you are from.

Please include a picture of yourself.

Mechanics background

Write a summary of your background in mechanics

(1 or 2 paragraphs)

What courses have you taken that covered mechanics or mechanical engineering?

What topics did you cover?

What outside exposure have you had to mechanical engineering?

What about practical mechanics? (Using machine tools, fixing cars, ...)

Technical writing experience

What technical writing experience do you have?

(1 or 2 paragraphs)

What courses have you taken that cover technical writing?

Have you worked where you needed to report your results?

Do you have other writing experiences?

Professional goals

What are your career plans, and why are you here?

(1 or 2 paragraphs)

When do you expect to graduate, with what degree?

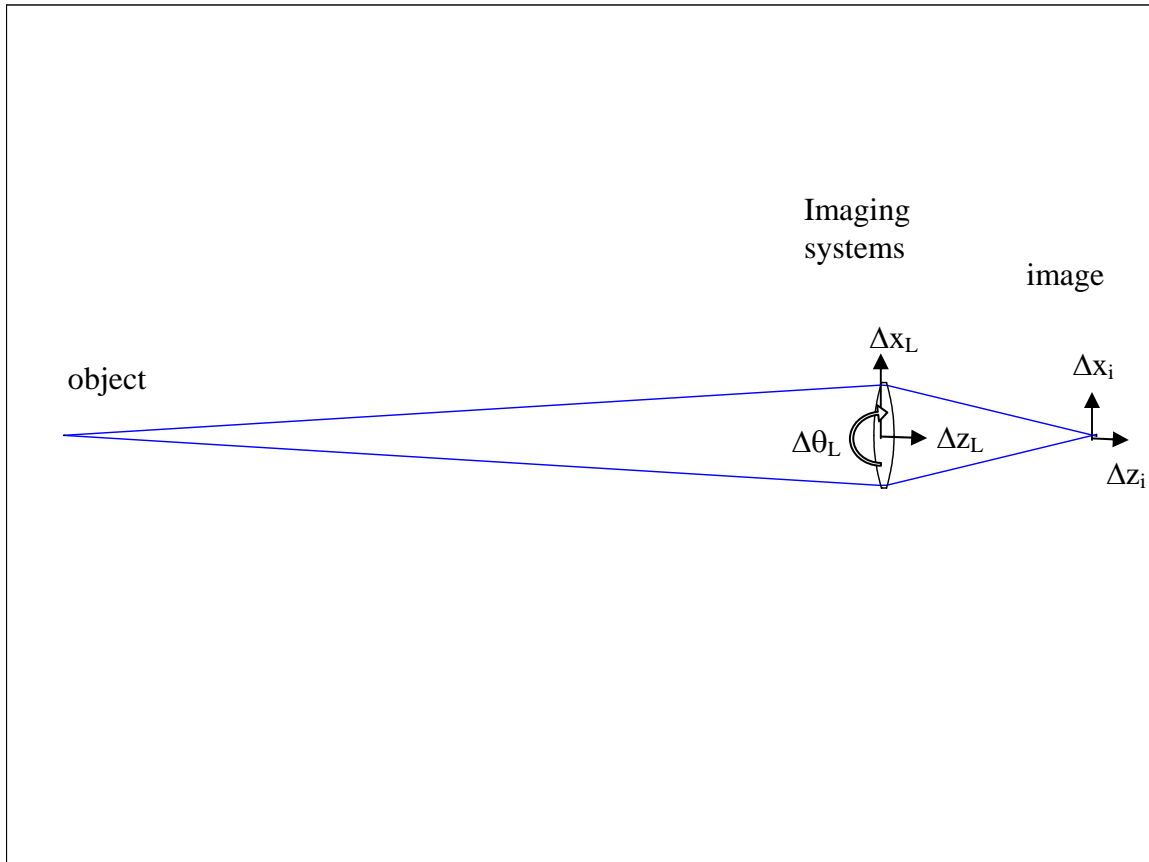
What type of job do you expect to pursue? (What would you avoid?)

What attributes and interests do you have that have led you to these goals?

Parts 2 and 3 can be submitted on paper or electronically.

2. First order derivation: Lens motion

- a) For the case of a thin lens, derive the relationships between image motion Δx_i , Δz_i and lens motion Δx_L , Δz_L , $\Delta\theta_L$ in terms of the system magnification m .
- b) Prove that the image shift Δx_i is consistent with the general relationship for any lens, knowing the lens focal length and beam diameter and the system focal ratio.



3. First order derivation: Mirror motion

Repeat a) and b) for the case of an image formed by a single mirror.

Does your solution make sense for a flat mirror, what about a convex mirror?