

**MATLAB / SIMULINK - Laboratory # 2 - Mathematical Models of Systems**

**Objectives:**

In this lab we consider some of the issues surrounding the modeling of physical systems.

**Equipment:**

Computer Lab PC, MATLAB - Simulink

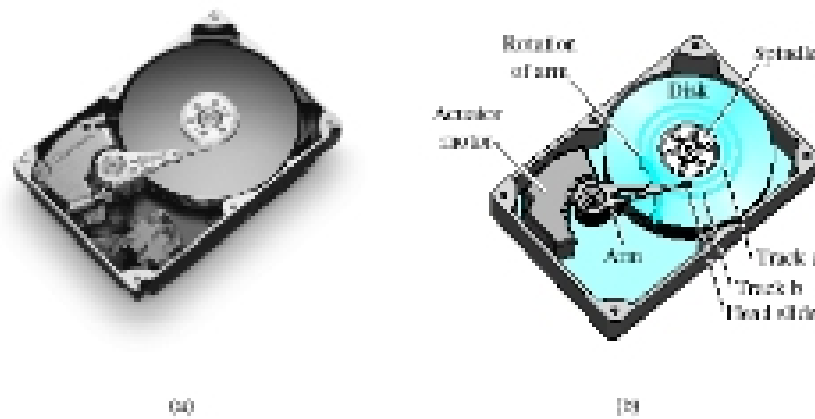
**Resources:**

Modern Control Systems, Dorf and Bishop

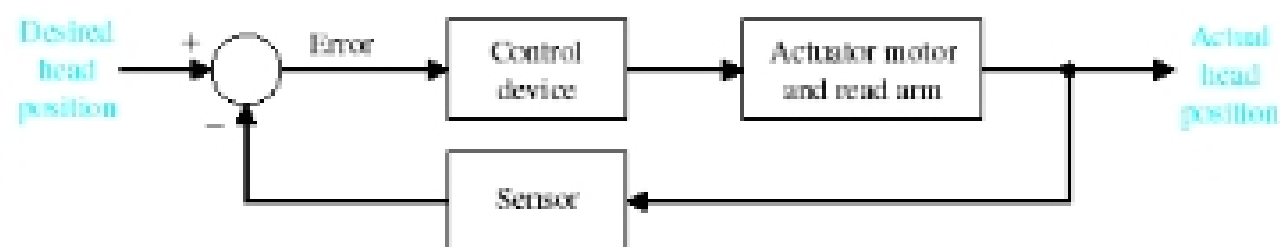
**Experiments:**

1 – Read and implement functions of Section 2.10 (to gain further familiarity with MATLAB). You may skip this part if you have already used of these functions.

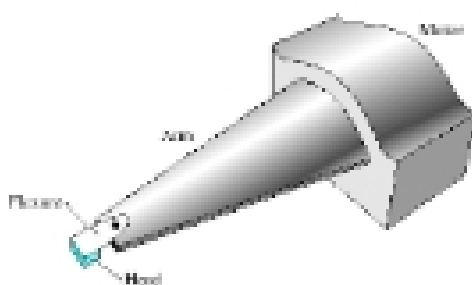
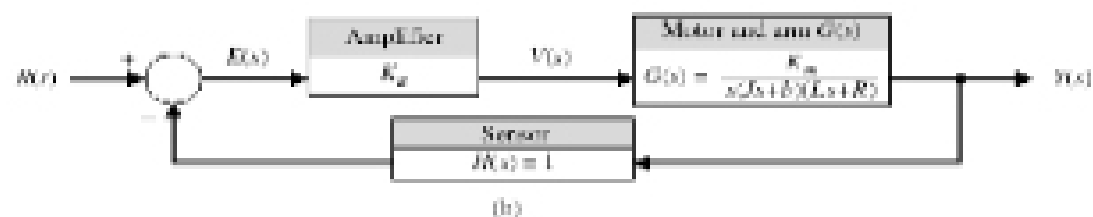
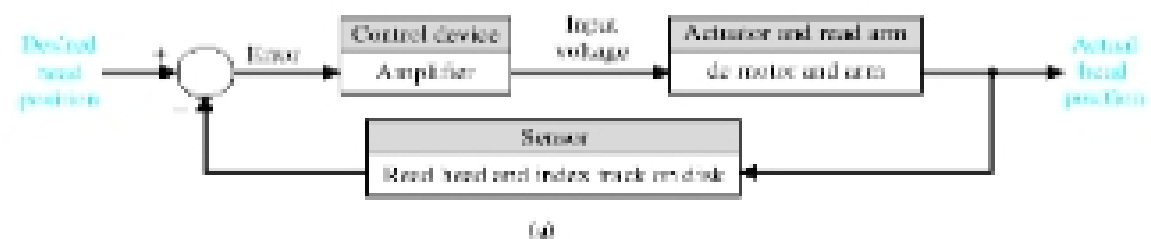
2 – Study, implement simulation and discuss results for example of section 2.11.



Disk Drive System



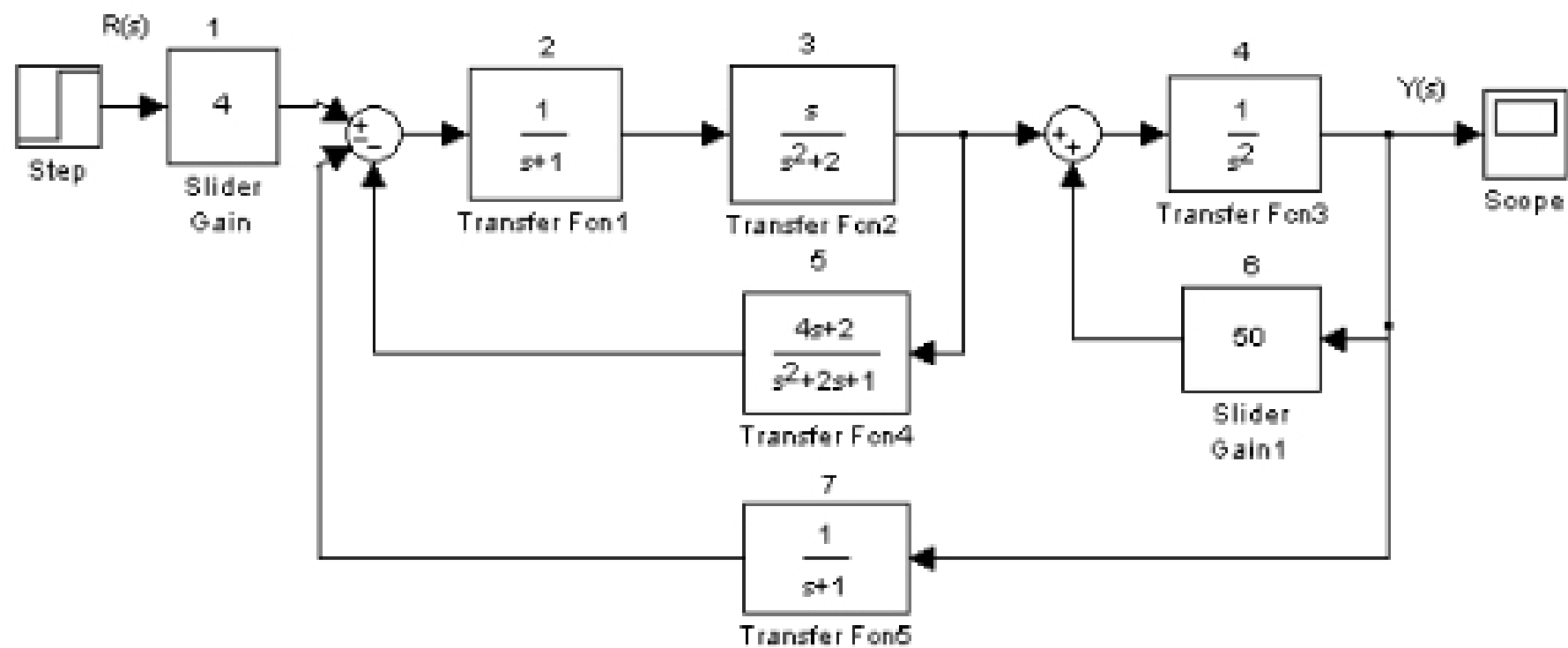
Close-loop control system



Head mount for reader

3 – Use MATLAB to reduce the block diagram of the system illustrated below and compute the closed-loop transfer function. Generate a pole-zero map of the closed-loop TF.

Implement the Simulink solution for a step input to verify the response of the system. Vary gains / constants and discuss the responses. The replace Transfer 5 by  $(s^2 + 2) / (s^3 + 14)$  and compare results.



**Report**

Summarize your observations and attach relevant MATLAB scripts, diagrams and plots. Report due two weeks from today.