

Analysis of Discrete-Time Systems

Deterministic Signals and Systems

Computer Project

- **The Purposes:** of this project are (i) to re-enforce your understanding of basic system concepts and properties, (ii) to introduce you to MATLAB — a useful software for Signals and Systems, (iii) to test and sharpen your analytical skills, and (iv) to improve your writing skills.
- **The Assignment:** is to analyze four discrete-time systems. The exact input-output relationships of the systems are not known to you. For each system, you have to determine whether it is: (i) memoryless, (ii) causal, (iii) BIBO stable, (iv) linear, and (v) time-invariant. You must find the answer by experimenting and “playing around” with the systems. See the accompanying notes.
- **The ECE CAD Lab:** is located in Room 281 in the Light Engineering Building. You must go to this lab to work on your project. The lab hours are: Mon 9am-4pm; Tue 10am-7pm; Wed 10am-6:30pm; Thu 10am-6:30pm; Fri 10am-5pm. To get an account in the lab: Turn left as you enter the lab. There are two computers on a workbench parallel to the wall. Follow the instruction on the screen. The account will be set up within 24 hours. If you have any problem with the account, see the Lab Manager — Mr. Scott Campbell.
- **The Written Report:** must contain at least the following three sections: Introduction (provide an overview of the project and your basic approach), Methodology (describe in details how you carry out the project and how you determine the properties of the four systems), and Results (concisely present the answers to the assignment). The report must be typed — not handwritten. The report should be at least 5-page long and at most 50-page long. The report may include graphs of your input and output signals and any MATLAB code you have written. In writing up your report, imagine that the reader is another bright student who has taken ESE 305 but does not know any details of this project. The project is due on Thursday December 9, 1999 (12:45 pm).
- **Collusion:** is NOT permitted. Each of you must work on the project individually. Do not share any result with others.

Grading: (100 pts Total) Your project grade will be based on the following:

- **Results: (20 pts)** Did you correctly identify the properties of the systems? One point for each correct answer.
- **Methodology: (50 pts)** What method(s) did you use to arrive at your results? Did you provide clear and strong evidence(s) to support your results?
- **Presentation: (30 pts)** How clearly do you present your methods and results? Does your report contain grammatical or typographical errors? Would another student (who has taken ESE 305) understand and appreciate your work?
- **Extra Credit: (25 pts)** Determine exactly what is the input-output relationship of each system. Five points for each system correctly identified. Five additional points if you correctly identify all four systems.

Early-Completion Incentive Program:

- If you turn in the project by 11/04/99 (12:45 pm), you will get 25 pts extra credit.
- If you turn in the project by 11/11/99 (12:45 pm), you will get 20 pts extra credit.
- If you turn in the project by 11/18/99 (12:45 pm), you will get 15 pts extra credit.
- If you turn in the project by 11/24/99 (12:45 pm), you will get 10 pts extra credit.
- If you turn in the project by 12/02/99 (12:45 pm), you will get 5 pts extra credit.
- If you do not turn in the project by 12/09/99 (12:45 pm), you will get no credit.