

## **SIO 207B / ECE 251A: Digital Signal Processing I**

Instructor:

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Course Description:

Discrete random signals; conventional (FFT based) spectral estimation. Coherence and transfer function estimation; model-based spectral estimation; linear prediction and AR modeling. Levinson-Durbin algorithm and lattice filters, minimum variance spectrum estimation.

Summary of Topics Discussed:

- (1) Inverse filtering and channel equalization.
- (2) Hilbert transforms. Homomorphic signal processing.
- (3) Discrete random sequences.
- (4) Conventional power spectral estimation.
- (5) Coherence and transfer function estimation.
- (6) Statistical properties of time series.
- (7) High resolution spectral analysis.
- (8) Speech processing.

Homework/Projects:

Approximately one computer-oriented homework assignment will be made per week. These can be worked on in groups and should be turned in as soon as possible for feedback. A mid-term and an end-term project will be assigned. These should represent individual effort (i.e. should be considered as take-home exams) and assistance should not be given nor received from anyone other than the instructor.

Grades:

No exams will be given. Grades will be assigned based on the weekly homework assignments and the mid/end-term projects. The homework assignments count 1/3 and the mid/end-term projects count 1/3 each. The class can be taken either for a letter grade or S/U.

Text:

A. Oppenheim and R. Schaffer. Discrete-Time Signal Processing. Prentice-Hall, 2010 (3<sup>rd</sup> Edition). ISBN 978-0-13-198842-2.