STAT 7338

Time Series Modeling and Filtering

Fall 2005

Time: **TuTh 9^{30} - 10^{45} am** *Room:* **CB 1.114** *Instructor:* Michael Baron

Office: EC 3.912 *Phone:* 972-UTD-6874 *Email:* mbaron@utdallas.edu

Text: **Time Series: Theory and Methods** by P. Brockwell and R. Davis, 2nd edition, Springer, 1991

Coverage: Most of chapters 1-7, parts of chapters 8-11

Grading:

Homework	0%	Homework will be assigned but will not be collected or graded. A serious and steady effort to work out all the homework problems is highly recommended.
Quizzes	30%	Short weekly quizzes closely related to the material of the latest homework assignment
Midterm exam	30%	A 1 1/4-hour midterm covers chapters 1-4 of [BD].
Final exam	40%	A 2 1/2-hour final covers chapters 5, 7-11 of [BD], but it is cumulative indirectly. Exams are open-book, -notes, etc.

90-100 % = A, 75-90 % = B, 60-75 % = C.

Syllabus

- Introduction and examples
- Hilbert spaces (this is the Math background that we need in order to treat the best predictor as *orthogonal projection* and to obtain *prediction equations*)
- MA, AR, and ARMA processes; causal and invertible processes (most popular time series models; later we will prove that any stationary process is "approximately" ARMA)
- Spectral representation of a stationary process. Prediction in frequency domain
- Recursive computation of the best linear predictor and its mean squared error
  - Durbin-Levinson algorithm
  - Method of innovations
- Estimation and model selection. Goodness-of-fit issues
- Nonstationary time series, ARIMA models and extentions

Prerequisites: STAT 5351 + STAT 5352 (Mathematical Statistics) or equivalent
Corequisite: STAT 6331 (Statistical Inference)

Michael Baron