Syllabus: SIO 221C, Data Analysis Laboratory

Sarah Gille
Class Meetings: Tuesday/Thursday 12:30-1:50, OAR 150 Conference Room
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Course website: http://www-pord.ucsd.edu/~sgille/sio221c
Grading: S/U

Course Objectives: Students refine data analysis skills by carrying out projects that employ specific techniques and by discussing data analysis problems with the group.

Course requirements: Complete 3 projects from list below (up to one project may be arranged with instructor to be tailored to research). Each project is scheduled to take 3 weeks. Report on progress at each class meeting and discuss problems and possible solutions with the group. Written reports are submitted at the end of each project.

Schedule:

— Organization: September 22

— Project 1: September 27, September 29, October 4, October 6, October 11, October 13 (written reports due October 13)

— Project 2: October 18, October 20, October 27, November 1, November 3, November 8 (written reports due November 8)

— Project 3: November 10, November 17, November 22, November 29, December 1 (written reports due December 1). (Extra meeting may be scheduled.)

No class meetings October 25, November 15, or Thanksgiving Day (November 24).

Projects

— Complex Demodulation

— Empirical Orthogonal Functions

— EOFs with Missing Data

— Objective Mapping

— Objective Mapping (with Anisotropic Decorrelation Functions)

— Geostrophic Velocity

— Salinity Spiking

— Wind-Driven Currents

— Wind-Driven Geostrophic Currents

— Box Inverse

— Wavelets

— Probability Density Functions

Texts on reserve for SIO 221C: Data Analysis Laboratory

Bendat, J. S. and A. G. Piersol, 1986: *Random Data: Analysis and Measurement Procedures*. John Wiley & Sons, 566 pp.

Bevington, P. R. and D. K. Robinson, 2003: *Data Reduction and Error Analysis for the Physical Sciences*. McGraw Hill, 320 pp.

Daley, R., 1991: *Atmospheric Data Analysis*. Cambridge University Press, 457 pp.

Emery, W. J. and R. E. Thomson, 2001: *Data Analysis Methods in Physical Oceanography*, 2nd edition. Elsevier, 638 pp.

Lawson, C. L. and R. J. Hanson, 1974: *Solving Least Squares Problems*. Prentice-Hall, 340 pp. (reprinted 1997)

Menke, W., 1989: *Geophysical Data Analysis: Discrete Inverse Theory*. Academic Press, 289 pp.

Noble, B., and J. W. Daniel, 1988: *Applied Linear Algebra*, 3rd edition. Prentice-Hall, 521 pp.

Preisendorfer, R. W., 1988: *Principal Component Analysis in Meteorology and Oceanography*, Elsevier, 425 pp.

Press, W. H., B. P. Flannery, S. A. Teukolsky and W. T. Vetterline, 1986: *Numerical Recipes*. Cambridge University Press, 818 pp.

Strang, G., 1976: *Linear Algebra and Its Applications*. Academic Press, 414 pp.

Strang, G., 1986: *Introduction to Applied Mathematics*. Wellesley-Cambridge Press, 758 pp.

Taylor, J. R., 1982: *An Introduction to Error Analysis*. University Science Books, 270 pp.

von Storch, H. and F. W. Zwiers, 1999: *Statistical Analysis in Climate Research*, Cambridge University Press, 484 pp.

Wunsch, C., 1996: *The Ocean Circulation Inverse Problem*. Cambridge University Press, 442 pp.