

ICTP DIPLOMA PROGRAMME IN EARTH SYSTEM PHYSICS 2012-2013
Mathematical Methods (ESP-MM)
(12 lectures : 18 hrs)

MM- ESP: Probability and Statistics

Main Topics

- 1) Probability basics (discrete and continuous problems)
 - a. Probability spaces, events, outcomes
 - b. Conditional probabilities
 - c. Independent events
 - d. Counting: permutations and combinations
 - e. Binomial, Poisson, uniform, Gaussian and other distributions of probability
 - f. Probability density functions
 - g. Mean and variance
 - h. Expectation operator
 - i. Higher order moments
 - j. Autocovariance and autocorrelation functions
 - k. Gaussian distributions
- 2) Joint properties of random data
 - a. Joint probability functions
 - b. Cross-correlation functions
- 3) Random data handling
 - a. Stationarity
 - b. Ergodic processes
 - c. Power spectral density functions (Fourier transforms)

Resources:

Recommended Book:

Bendat & Piersol, Random Data: Analysis and Measurement Procedures. (Wiley, 1971)