(EEE.5.6, 3-0) Stochastic Signals

Special topics on random variables. Moment generating and characteristic functions. Jointly distributed random variables. Joint normal random variables. Distributions of functions of random variables. Sum of independent random variables. Conditional expectation and variance. Mean square estimation. Random vectors. Expectation of random vectors and covariance matrices. Normal random vectors. Estimation of vector means and covariance matrices. Linear estimation of vector parameter. Basic concepts of random sequences. Random sequences and discrete time linear systems. Random vectors and stochastic convergence. Basic concepts of stochastic signals. Statistical averages. Wide-sense stationary processes. Mean, autocorrelation function and average power. Ergodicity. Stochastic signals in the frequency domain. Power spectral density. Transmission over linear and time-invariant systems. Gaussian and white signals. Sampling of bandlimited stochastic signals. Bandpass stochastic signals. Computer generation of random variables and random processes.