
Detection and Estimation Theory

Finalità

To describe the theoretical foundation of detection and estimation theory with application to digital communication systems.

Programma

Discrete representation of deterministic and random signals.

Detection theory

Statistic model for detection. MAP criterion. Detection in the presence of additive white Gaussian noise. Sufficient statistics. Matched filter. Detection in the presence of additive Gaussian colored noise: reversibility theorem. Detection in the presence of random parameters.

Estimation theory

Statistic model for estimation. Estimation of deterministic parameters: ML criterion. Estimation of stochastic parameters: Bayes criterion. Cramer-Rao inequality. Minimum mean square linear estimation. Wiener filter. Prediction. Kalman filter.

Attività d'esercitazione

Solution of previously assigned problems.

Modalità d'esame

Written and oral exam.

Propedeuticità

None

Testi consigliati

G. Colavolpe, R. Raheli, Lezioni di Trasmissione numerica, Monte Università Parma editore, 2004.
H. L. Van Trees, Detection, estimation and modulation theory, Part I, John Wiley and Sons, 2001.