

International Doctorate in Civil and Environmental Engineering

CORSO DI DOTTORATO

Inverse problems and time-series analysis

Docenti: Prof. **Fabio Castelli**

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Calendario delle lezioni

Mercoledì 10 aprile 2019 – ore 14,00-18,00 Aula da definire, Scuola di Ingegneria, Via di S. Marta 3, Firenze	Introduction to inverse problems. Linear inverse problems: least squares, underdetermined and overdetermined problems, generalized inverse. <i>Exercise on the tomography problem.</i>
Mercoledì 17 aprile 2019 – ore 14,00-18,00 Aula da definire, Scuola di Ingegneria, Via di S. Marta 3, Firenze	Bayes theorem and Bayesian sequential state estimation. Kalman, Ensemble Kalman and Particle Filters. <i>Exercise on Lorenz model.</i>
Mercoledì 8 maggio 2019 – ore 14,00-18,00 Aula da definire, Scuola di Ingegneria, Via di S. Marta 3, Firenze	Stochastic processes: stationary and ergodic processes; trend and seasonal components removal. Time series models: Brownian motion, AR, MA, ARMA and ARMAX models. <i>Exercise on monthly river-flow and rainfall time series.</i>
Durata totale del corso	12 ore

Programma

Introduction to inverse problems. Linear inverse problems: least squares, underdetermined and overdetermined problems, generalized inverse. Bayes theorem and Bayesian sequential state estimation. Kalman, Ensemble Kalman and Particle Filters. Stochastic processes: stationary and ergodic processes; trend and seasonal components removal. Time series models: Brownian motion, AR, MA, ARMA and ARMAX models.