ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

DEPARTMENT
OF STATISTICAL SCIENCES
"PAOLO FORTUNATI"

"Peter Carr" Seminars

Giovedì 16 Aprile 2026 alle ore 13.00

Sia in presenza, presso l'aula 1 in Piazza Scaravilli, 2, a Bologna, sia in modalità telematica, mediante sistema di videoconferenza su piattaforma Microsoft Teams

"Stratified Copula State Space and Regime-Switching Diffusions"

Dott. Leonardo Marconi
(University of Bologna)

Abstract

We introduce a class of continuous-time Markov processes on spaces of hierarchical copula structures. The state space is constructed by gluing Euclidean parameter cells associated with rooted binary hierarchies along lower-dimensional faces corresponding to vanishing increment coordinates, thereby producing a stratified space whose lower-dimensional strata represent less resolved, multifurcating hierarchies. For a fixed homogeneous Archimedean copula family, we show that this geometric quotient provides a natural parametrization of nested copula models. On this stratified space, we construct regime-switching dynamics combining continuous evolution of copula parameters within each hierarchy with random transitions between hierarchies. The within-stratum dynamics are given by diffusions on the Euclidean strata, while the jump mechanism is described by state-dependent kernels between strata, allowing both topology changes within a fixed dimension and variable-dimensional transitions between more and less resolved dependence structures. A principal example is a data-informed class of processes in which the drift is driven by a copula likelihood together with confining and boundary-repelling terms, and the jump rates are of Metropolis type, favoring hierarchies that better explain the data. The resulting processes provide a probabilistic framework for joint parameter learning and structural exploration over hierarchical dependence models. The construction is motivated by high-dimensional dependence modeling and suggests a continuous-time approach to stochastic model selection on singular parameter spaces.

L'Organizzatore
Prof. Sabrina Mulinacci

Il Direttore
Prof. Carlo Trivisano

La S.V. è invitata