



CICLO DE CONFERENCIAS ESTADÍSTICA Y CIENCIA DE DATOS PATRICIA ROMÁN

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Título: Modeling irregular longitudinal data with non-homogeneous lognormal diffusion processes.

Fecha y hora: 5 de febrero del 2026 (10.30 horas).

Lugar: Seminario I del IMAG, UGR.

Conferenciante: Ana García Burgos.

Resumen:

We address the problem of inference and imputation in non-homogeneous lognormal diffusion processes when data are sparse and irregularly observed in time. Standard imputation techniques typically condition only on past information, which can be inadequate when previous observations are unavailable or temporally distant from the prediction point, resulting in increased uncertainty.

In this work, we extend the conditioning framework by incorporating information from the observation closest in time to the prediction point, regardless of whether it occurs in the past or the future. Within the class of non-homogeneous lognormal diffusion processes, we derive conditional distributions given future observations for several relevant models, including Gompertz, logistic, and Bertalanffy-type processes. Closed-form expressions for key characteristics such as the conditional mean, mode, and quantiles are obtained.



The proposed approach is evaluated through a simulation study motivated by fetal growth data, where individuals are observed at non-equidistant times and with varying numbers of measurements. We compare imputation based on past conditioning, future conditioning, and conditioning on the nearest observation. The results indicate that the nearest-observation strategy consistently improves imputation accuracy, as measured by MAE and RMSE, while remaining applicable in all sampling scenarios. These findings suggest that nearest-observation conditioning provides a flexible and reliable alternative for imputation in longitudinal studies with incomplete and irregular data, with potential applications beyond growth modeling.

Breve reseña del conferenciante:

Ana García Burgos is

PhD student in the Doctoral Programme in Mathematical and Applied Statistics, with a Master's degree in Applied Statistics and a Bachelor's degree in Mathematics. Interim Substitute Lecturer at the Department of Statistics and Operations Research (2020-present).