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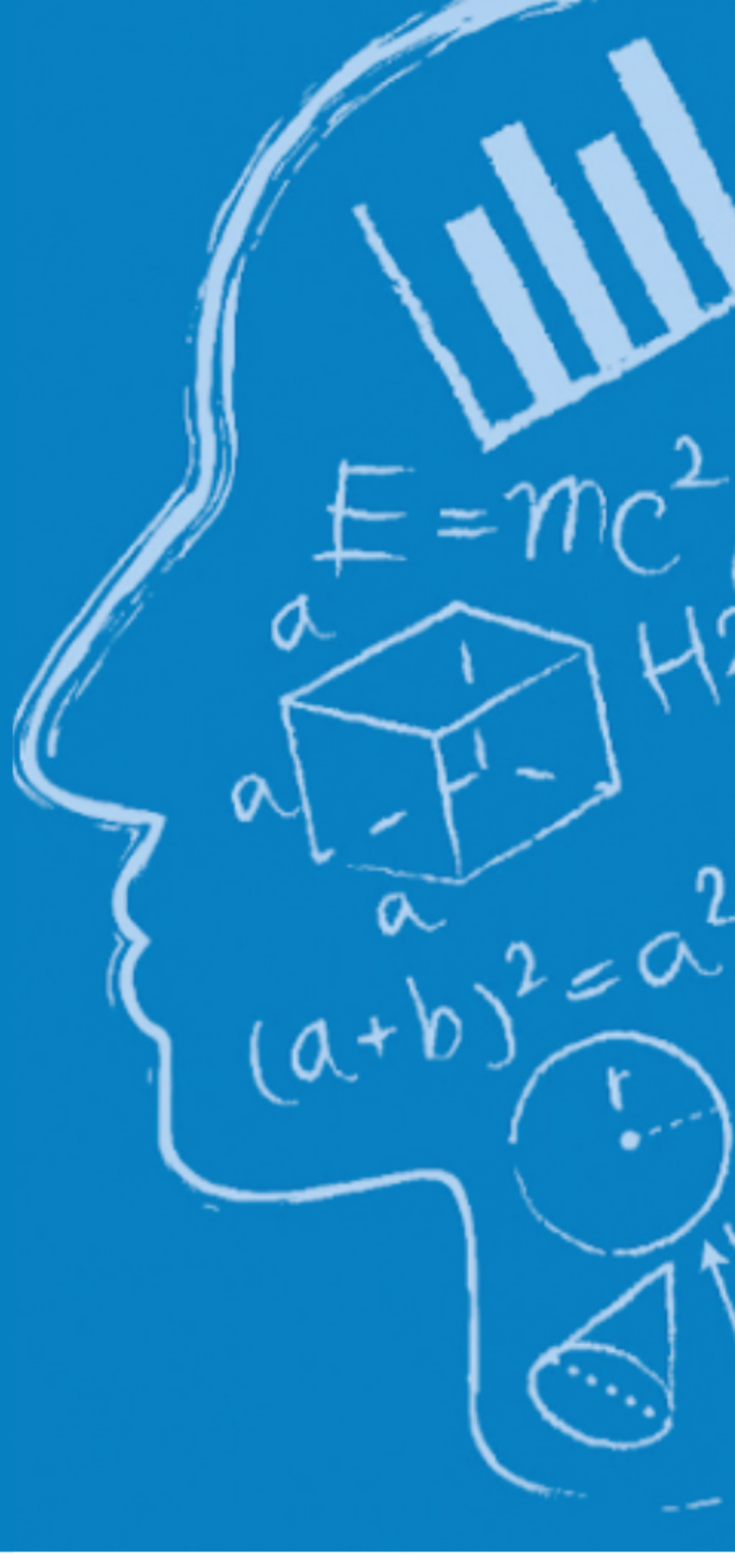

LONG-TERM DAGUM-POWER VARIANCE FUNCTION FRAILTY REGRESSION MODEL: APPLICATION IN HEALTH STUDIES

ABSTRACT:

Survival models with cure fractions, known as long-term survival models, are widely used in epidemiology to account for both immune and susceptible patients regarding a failure event. In such studies, it is also necessary to estimate unobservable heterogeneity caused by unmeasured prognostic factors. Moreover, the hazard function may exhibit a non-monotonic shape, specifically, an unimodal hazard function. In this work, we propose a long-term survival model based on a defective version of the Dagum distribution, incorporating a power variance function frailty term to account for unobservable heterogeneity. This model accommodates survival data with cure fractions and non-monotonic hazard functions. The distribution is reparameterized in terms of the cure fraction, with covariates linked via a logit link, allowing for direct interpretation of covariate effects on the cure fraction—an uncommon feature in defective approaches. We present maximum likelihood estimation for model parameters, assess performance through Monte Carlo simulations, and illustrate the model's applicability using two health-related datasets: severe COVID-19 in pregnant and postpartum women and patients with malignant skin neoplasms.

14 April, 2025
Monday

14:00

Ciências ULisboa C6, Floor 4, SASLab (room 6.4.29) & ZOOM

Project UID/00006/2025
DOI: 10.54499/UIDB/00006/2020

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Agatha Rodrigues holds a PhD in Statistics from the Institute of Mathematics and Statistics of the University of São Paulo (2018). She has a degree in Statistics from the Federal University of São Carlos (2010) and a master's degree in Statistics from the Institute of Mathematics and Statistics of the University of São Paulo (2013). She has experience in the area of Probability and Statistics, with an emphasis on Reliability Analysis, Survival Analysis, and Biostatistics. She is currently a professor at the Department of Statistics at the Federal University of Espírito Santo (UFES), coordinator of the teachR extension project (which aims to disseminate, teach, and train the community on the R software), and co-founder of R-Ladies Chapter Vitória (https://www.meetup.com/pt-BR/rladies-vitoria/ and https://github.com/rladies/meetup-presentations_vitoria). She is also the coordinator of the DaSLab laboratory (https://daslab-ufes.github.io/). GitHub can be accessed at: https://github.com/agathasr. Currently coordinates the project "Brazilian Obstetric Observatory", supported by CNPq, FAPES, and the Bill and Melinda Gates Foundation in the Call for Data Science in Maternal and Child Health (https://observatorioobstetricobr.org)