

Bias-reduction methods for Poisson regression

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This is a joint work with



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- ☞ P. Diaconis and D. Ylvisaker, “**Conjugate Priors for Exponential Families**”, Ann. Statist., 1979.
- ☞ D. Firth, “**Bias Reduction of Maximum Likelihood Estimates**”, Biometrika, 1993.
- ☞ T. Rigon and E. Aliverti, “**Conjugate priors and bias reduction for logistic regression models**”, Statist. Probab. Lett., 2023.

- ☞ Generalized linear models (GLMs) have some **well-known limitations**.
- ☞ One above all is the **presence of bias** in the maximum likelihood estimates (MLEs).
- ☞ Unfortunately, albeit **theoretically appealing**, most of the proposed methods in literature may face **computational bottlenecks**.
- ☞ Since **belonging to the GLMs**, the Poisson regression models **are not exempted** from these problems.

A conjugate penalization to reduce the bias

- ☞ In Rigon and Aliverti (2022) a **fast alternative** is introduced for the logistic regression.
- ☞ We present a **bias-reduction** method for Poisson GLMs that brings **computational advantages**.
- ☞ **Penalizing** the likelihood with the Diaconis and Ylvisaker (1979)'s **conjugate prior**, the resulting posterior law is a genuine likelihood function in which **pseudo-counts** substitute the response variables.
- ☞ Obtaining in an **approximation** of Firth (1993)'s method, a milestone in the bias-reduction literature.

Thanks for your attention!

**Looking forward to seeing you all
at my poster!**