20592 - Statistics and Probability

(Computational Statistics: Rebecca Graziani – Filippo Ascolani)

Final Project

Deadline January 12 2022, for students attending the General exam on
January

Bayesian estimation of a probit regression model

Read the paper by Albert and Chib, 1993.

Write two scripts

- One implementing the Metropolis Algorithm described in Slide 4.
- One Implementing the Auxiliary Gibbs Sampler in the Slides 5 to 10. Use Python built-in
procedures for sampling from univariate truncated normal densities or the algorithm
described in Slide 12.

Run the scripts on simulated data set or on a real dataset, for different choices of the parameters
specifying the proposals and of the parameters specifying the prior assigned to the parameters.

Run basic diagnostics of the convergence of the algorithms, through trace plots and the computation
of the acceptance rate. Only on a voluntary base explore and run additional diagnostics.

Compare the performance of the two algorithms.

In a report provide a description of the derivation of the full conditionals of the Gibbs Sampler
suggested by Albert and Chib, describe and discuss your findings, through tables and charts.