

This document contains the instructions to use the computer programs included in the current folder. These programs calibrate a discrete Markov Chain using the method described in Civale, Díez-Catalán and Fazilet (2015). This method maps a calibrated first order autoregressive process with normal mixture innovations (NMAR) into a discrete Markov Chain. This mapping is done with the objective of obtaining a Markov process that matches as closely as possible a set of specified moments of the NMAR. In this application we choose variance, skewness, kurtosis and autocorrelation of the NMAR.

- The programs included in this folder and described below are written in Fortran 95. To obtain the discrete Markov Chain, first compile all the \*.f90 files typing “make”. Then, execute the file “program” typing “./program”.

#### SPECIFIC INSTRUCTIONS:

- Unzip the file “Extended\_Tauchen.zip”. This expands into a folder with 5 documents:
  - main.f90: This is the main program. It calls types\_module.f90 and tools\_module.f90.
  - tools\_module.f90: It contains some auxiliary subroutines and functions.
  - types\_module.f90: The types of the variables are defined.
  - makefile.
  - stop: write "stop" in the stop file to terminate the current run of the code, storing all the output found so far.
- The inputs to the program which need to be changed at the beginning of main.f90:
  1. Parametrization of the NMAR process to be discretized.
  2. Cardinality of the state space.
  3. Number of random restarts.
- The output of the program are 3 text files for each cardinality:
  - results: summary of the results
  - states\_iter: the evolution of the state space for every 100th iterations.
  - criteria\_iter: the evolution of the criteria for every 100th iterations.