PROBLEM SET 4

AAEC 6564 / INSTRUCTOR: KLAUS MOELTNER

General Instructions

Please type everything in LaTeX (including all Math) and hand in a pdf file. For problems involving Matlab, answer questions in LaTeX, and attach your script, log file, and any graphs to your main pdf file.

Question 1

Consider the AR1 model we discussed in class. Solve this model using a random-walk-chain MH step in your GS for draws of ρ instead of an independence-chain (IC). Examine your output and comment on any major differences compared to the IC results.

Some tips:

(1) Use the same simulated data, generated by script `AR1data` (T=100)
(2) You can adopt main script `AR1ic` (call it `AR1rwc`), but you will need to change the tuner(s) for draws of ρ. Specifically, **choose rhostd=0.12**. Stick with 10,000 burn-ins and 10,000 keepers.
(3) You can build on GS function **gs_AR1_ic**, with the following modifications for draws of ρ:

  (a) Use a basic, *un*-truncated normal CGD
  (b) Impose the "if abs(rhocan)< 1" condition to automatically discard any draws of ρ outside the [-1,1] interval
  (c) recall that this CGD is symmetric and can thus be ignored in the acceptance probability

Question 2

PART I

Consider the SSVS model and the fishing data we used in class. Consider augmenting the baseline data space with observations corresponding to stillwater (= lake) fishing, i.e data set "D3" with interaction matrix "Z3" in our lecture scripts.

Use the same settings (priors, tuners, repetitions) as in `mod8_SSVS_fishing`. Label script and output `ps4_q2a`.

Comment on the inclusion probabilities for each element of $Z3$. Does it look like the lake data can be fully pooled (i.e. shares the same coefficients) with the river data (= the baseline)?

PART II

Compute the total model space, the number (and fraction) of visited model, and the empirical posterior probability for all visited models. Label script and output `ps4_q2b`.

Which model is the most probable? What does that suggest for the poolability of the data?

Which model is the second most likely? How does this compare to your inclusion probabilities from PART I?

PART III

Estimate every feasible model in isolation and generate Posterior Predictive Densities for WTP in log form and dollars for each model, using log(catch)=1.55, and log(income)=11. Select 10,000 burn-ins and 10,000 keepers in each case.

Then, using your results from part II, generate model-averaged PPDs for the same settings of log(catch) and log(income).

Create a table that shows the mean, std, and $p\,(>0)$ for each model and the BMA version, for both the logged and unlogged PPDs. Based on the std's, which model is the most efficient in each case? How does the BMA model compare to the other models, especially the fully-pooled model (no separate intercepts or interactions) and the fully-general model (separate intercepts, plus all interactions)?

Plot the PPDs for the fully-pooled model, the fully-general model, and the BMA model for both the logged and unlogged version of WTP and comment on any differences between the plots.