

Lecture 9 Homework:

(due by Lecture 10 in Chalk FINM331 Assignments submenu)

- You must show your work, code and/or worksheet for full credit.
- Justifying each non-trivial step with a reason is part of showing your work.
- There are 10 or more points per question if correct and best answer.
- Report numerical values in at least 4 significant digits (e.g., for errors use format like %8.3e).

1. (30 points) **Bayesian Estimation with MCMC for the Merton Jump-Diffusion Model Generalized to Multivariate Assets with a Common Jump Counting Process:**

Use the Bayesian MCMC Method of Subsect. 9.10.2, L9-pp. 34-46 to estimate the jump-diffusion parameters for two (2) related assets, one an index and the other a stock on the index over three (3) trading years such as 2007-2009. Produce a table like the Table 1 of Johannes and Polson (2003) of prior and posterior parameter means and standard deviations. Use a 95% credible interval as **mean \pm 1.96*std**. Use about 500 iterations for the Gibbs sampler, discarding the first 150 as burn-in, but this is only for keeping the problem effort reasonable. Use reasonable guestimates for the prior parameter and start out with a **$\Lambda \simeq 0.05$** to ensure a 0-1 jump law. (Note that Johannes and Polson (2003) use **λ** for the common Poisson average jump count in place of the **Λ** properly used in class, so they do not mean the jump rate.)