**AGEC 643**

**Home Work 2**

**Due October 17, 2014**

**At Noon**

Use the data in HomeWork2 2014.xlsx for problems 1-6. For problems 1-5 you must use the “general formula” for simulating multivariate CUSDs and CSNDs. Do NOT use MVNORM() or MVEMP().

1. Simulate the 8 random variables (four crops yields and prices) as multivariate normal after detrending the data. **NOTE: using the residuals from trend means you must use the standard deviation of the residuals not the standard deviation from the original data.** (Explain in writing why this is the correct standard deviation for the problem.) Assume the mean of the simulated values equal their respective historical means
   1. Validate the MVN distribution including checking for the correlation matrix.
   2. Print the steps used for the MVNORM, the summary stats for the simulated output and the validation tests
2. Repeat problem 1 for MVNorm but this time use the trend forecasted valued for 2014 as the “means” for the simulation
   1. Explain why the Hoteling T test failed.
3. Repeat problem 1 for an MVEmpirical Distribution
4. Repeat problem 1 for a MVCopula, use the Clayton Copula. The validation will be less conclusive as we do not have a good validation test for copulas
5. Repeat problem 1 as a MVKernal, use Parzen as the kernal.
6. In the HomeWork2 2014.xlsx workbook you will find a worksheet named Matrix. Please factor the correlation matrix by hand and then check your work with Simetar. Turn in both answers showing your work.
7. Use the stochastic prices and yields in problem 2 and estimate the PDF for net cash income of a farm that grows the four crops assuming the following:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Cotton | Wheat | Sorghum | Corn |
| Planted Acres | 100 | 200 | 150 | 300 |
| Fixed Cost $/acre | 350 | 140 | 160 | 500 |
| Variable Cost/ Yield Unit | 0.15 | 0.35 | 0.50 | 0.50 |
|  |  |  |  |  |
|  |  |  |  |  |

Print your model and the summary statistics for Net Returns for each crop and for the total farm. Calculate the probability of a negative net return for each crop and for the farm.