**AGEC 643**

**Home Work 2**

**Due October 16, 2015**

**At Noon**

Use the data in HomeWork2 2015.xlsx for problems 1-3. For problems 1-5 you must use the “general formula” for simulating multivariate CUSDs and CSNDs. Do NOT use CUSD(), CSND(), 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 for the original data. Check the data to make sure a single trend will work, and if not spline two trends. If a spline trend is needed, it may be different for each variable.** 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 2015 as the “means” for the simulation
   1. Explain why the Hoteling T test failed.
3. Repeat problem 1 for an MVEmpirical Distribution

HINT: The output you hand in for problems 1-3 have the same parts and tests. It will be much easier if you copy the SimData for problem 1 to a new worksheet and send the results from problem 2 to the new worksheet. The summary stats, and validation tests will be automatically be updated. Repeat his for problem 3.

1. Repeat problem 1 for a MVCopula, use the Clayton Copula. Use the CUSD() function. The validation will be less conclusive as Simetar does not have a good validation test for copulas.
2. Repeat problem 1 as a MVKernal, use Parzen as the kernal. Use the CUSD() function.
3. In the HomeWork2 2015.xlsx workbook you will find a worksheet named Matrix. Factor the correlation matrix by hand and then check your work Then perform the R’R to prove you did it correctly. Next factor the matrix with Simetar. Turn in your answers showing your work.
4. 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.