AGEC 622
03_cycles Exercises
Due before the beginning of class 04

- Complete the exercises in the provided notebook "03_exercises_LASTNAME_FIRSTNAME.xlsx".
- **Rename your file, replacing "LASTNAME_FIRSTNAME" with your actual names.**
- If there is more than one question, note that each will have its own tab in the workbook.
- **Work vertically down the sheet** within your notebook. Separate the individual parts of the question(s) (a, b, c, . . .) using dividing rows like the blue example dividers in the file.
- Submit this homework by emailing your xlsx file to henry@tamu.edu, **with the subject "AGEC 622 exercises 03".**

1) Question 1

For this question, you will fit a model for monthly hog slaughter data potentially using any or all of a trend, an annual/seasonal cycle, and a longer cycle.

a) **Set up the data**. Set up some space at the top of the sheet (above the column headings) where you will put a cycle length for a longer cycle. Create variables for T, $ANNUAL\_COS$, $ANNUAL\_SIN$, $CYCLE\_COS$, and $CYCLE\_SIN$. The last two variables should reference the cycle length at the top of the sheet.

b) **Estimate a regression model**. Estimate a regression model for the hog slaughter, including all of the variables you created above as independent variables.

c) **Determine the optimal cycle length**. For the longer (than one year) cycle, create a table of the Schwarz Information Criterion value for cycle lengths of 18, 24, 30, . . . , 84 months. Highlight the optimal cycle length in your table.

d) **Simulate the hog slaughter for December of 2019**.

- Determine the values for December 2019 for the independent variables in the model. Use these to create a conditional mean forecast.
- Specify a normally distributed stochastic error term, using appropriate values based on the regression results.
- Specify a formula for the final stochastic hog slaughter number. Simulate this number.
- Use the simulated value to create a PDF plot for the December 2019 hog slaughter.