Homework 23

Ch En 263 – Numerical Tools

Due date: 15 Jun. 2020

Instructions

- For the handwritten problems, submitted a single pdf file on Learning Suite with the name "LastName_FirstName_HW23.pdf".
- For the problems in Excel, submit a workbook named "LastName_FirstName_HW23.xlsx" where each worksheet tab is named "Problem_1", "Problem_2", etc.
- For the problems in Python, submit a separate file for each problem named "LastName_FirstName_HW23_ProblemXX.py" where XX is the problem number.
- **Please report how long it took you to complete the assignment (in hours) in the "Notes" section on Learning Suite.**

Problems

1. Complete the practice problem (c) from the lecture notes Lec23-Ex-Toluene_Heat_Capacity.xlsm discussed in class. Namely, write a function in VBA called "dot" that takes the dot product of the values of columns of A and B. Call this function in the cell `H15`. Rename your file "LastName_FirstName_HW23.xlsm" and submit it to Learning Suite.

2. Complete the practice problem (f) from the lecture notes Lec23-Ex-Toluene_Heat_Capacity.xlsm and Lec23-Ex-XLWings.py discussed in class. Namely, use XLWings to read the values of A and B from the Excel spreadsheet, then use `np.dot` (or your own dot product function) to compute the dot product, and place the result in `J15`. Rename your file "LastName_FirstName_HW23.py" and submit it to Learning Suite.

3. Go through your old homework assignments and find a problem where you can either use VBA or XLWings in a new and interesting way to solve that problem. Re-do that homework problem, this time integrating Excel and Python. For example, you might take Problem 3 from Homework 19 (where you were asked to calculate several numerical integrals in Python) and write a function in VBA that computes these integrals. You are free to pick (a) what problem you want to integrate and (b) what you do to integrate VBA or XLWings into that problem. To get full credit you will need to:

   - Write or type a brief explanation (i.e. a few sentences) of what problem you picked and how you used either VBA or XLWings. This explanation should be saved as a pdf.
   - Your code should work and compute the correct answer from the original problem.
   - Submit a zipped folder "LastName_FirstName_HW23-P3.zip" that contains all your files and a pdf copy of your explanation.

   This is an open-ended opportunity to explore something new. We will not be harsh grading this problem, so don't worry too much about the grade, rather pick something that you want to learn.