Computation, Problem Set #4, Differentiation, Integration, and Optimization

OSM Lab, Justin Gardiner

Due Thursday, July 20 at 8:00am

Do the following Exercises from the Brigham Young University Applied Mathematics and Computational Emphasis (ACME) Python labs Humpherys and Jarvis (2017) and from Richard Evans' notes.

1. **Exercises from ACME: PageRank lab.** Do problems 1 through 5 (NOT problem 6) from PageRank lab. You will need to download the matrix.txt and ncaa2013.csv files, which are saved in the course repository.
2. **Exercises from ACME: Conditioning and Stability lab.** Do problems 1 through 6 from Conditioning and Stability lab. You will need to download the stability_data.npy file, which is saved in the course repository.
3. **Exercises from ACME: Numerical Differentiation lab.** Do problems 1 through 8 from Numerical Differentiation lab. You will need to download the plane.npy file, which is saved in the course repository.
4. **Exercises from Evans: Numerical Integration lab.** Do exercises 14.1 through 14.9 from Numerical Integration lab.
5. **Exercises from ACME: Simplex Method lab.** Do problems 1 through 7 from Simplex Method lab. You will need to download the productMix.npz file, which is saved in the course repository.
6. **Exercises from ACME: Line Search Methods lab.** Do problems 1 through 5 from Line Search Methods lab.
7. **Exercises from ACME: Newton's Method lab.** Do problems 1 through 7 from Newton's Method lab.
8. **Exercises from ACME: Iterative Solvers lab.** Do problems 1 through 7 from Iterative Solvers lab.

References

Humpherys, Jeffrey and Tyler Jarvis, "Computational Labs for Foundations of Applied Mathematics, Volumes I and II," 2017.