

Introduction to mathematical optimization using Python

Indranil Ghosh

Twitter: @indraghosh314

Website: indrag49.github.io

School of Mathematical and Computational Sciences
Massey University, Palmerston North, New Zealand

February 18, 2023



- I am a final year Ph.D. student in Applied Mathematics at the School of Mathematical and Computational Sciences, Massey University.
- Python is my go-to language for solving any complex numerical problems I am dealing with, but I know R, and a little bit of `matlab` too.
- Hobbies: Mountaineering, poetry, football, anime, and metal.

Tutorial overview

- This tutorial is meant to be a pedagogical introduction to the concept of *unconstrained numerical optimization* with Python.
- I plan to cover both the theoretical background along with hands-on implementations of the optimization algorithms with Python
- We will mainly use the following four scientific computing libraries: `numpy`, `scipy`, `autograd` and `matplotlib`.
- I expect a little introductory knowledge of Python (for example loading libraries and stuff) and a little mathematical knowledge like what vectors and matrices are from the audience.
- I maintain a blog on the same topic: indrag49.github.io/Numerical-Optimization

Link: github.com/indrag49/Numerical-optimization-PyDelhi-meetup

- **Jorge Nocedal, Stephen J. Wright.** Numerical Optimization.
- **Jan A. Snyman, Danile N. Wilke.** Practical Mathematical Optimization
- **Singiresu S. Rao.** Engineering Optimization: Theory and Practice.
- **James F. Epperson.** An Introduction to Numerical Methods and Analysis.

Thank you! Questions?