Julia for High-performance computing

We introduce a series of notes on Scientific Programming with Julia Language as part of CINECA course. We aim to provides a cohesive course on Scientific Programming with Julia Language for beginners/intermediate levels. We will also cover some advance topics, mainly parallel computing both on CPUs and GPUs. Because data science and Machine learning is a popular topic nowadays. We also focus on the basic concept of data science and Machine learning techniques.

**Teachers:** R. Assante, A. Marani and N. Shukla

**Target audience:** Beginner + Intermediate

**Resources:** G100/M100

**Day-1 : Introduction to Julia (10:00 am to 5:00 pm)**

10:00 – 12:45 to 14:00-17:00

- Why another programming language?
- What is Julia?
- Why choose JuliaLang?
- Getting started with Julia
  - Setting up Julia enviroment
  - Basics of Julia
  - Function and methods
  - Control flow
  - Debugging
  - Files
  - Plots

**Day-2 : Parallel computing with Julia ( N. Shukla and A. Marani)**

10:00 – 12:45

- Introduction to HPC (Guest Lecture by Alessandro Marani)
- Optimization of a julia code

14:00- 17:00

- Multithreaded parallelization
- Distributed computing
- Parallel computing on GPY

**Day-3 : Data science with Julia**

10:00 – 12:45

- Linear algebra
• Working munging
• Data processing tools
• Regression
• Simple Regression
• Multi regression
• Clustering

14:00- 17:00

Final project