High Performance Scientific Computing

- Teacher(s) name: Luca Gemignani
- Semester: I
- Exam mode: seminar with discussion of implementative issues and numerical results
- Pre-requisites: none
- Area: Computatonal Mathematics, Scientific Computing

Syllabus

- Numerical methods that are highly efficient in terms of complexity, numerical properties and possibility to be used in distributed computing environments.
- Iterative methods for linear system solving and eigenvalue computation: synchronous and asynchronous iterations.
- Numerical and computational treatment of sparse and data sparse matrices: graph—based partitioning algorithms and hierarchical structures and representations

Thesis available

- Parallelizing iterative solvers
- Applications in data analysis, analysis of complex networks, graph spectral theory, spectral clustering, interior point methods, Markov chains and queuing models.
- Examples: Krylov methods for Pageranking; Iterative methods for Generank; Parallel solvers of Poisson's equations