CLASSIC AND QUANTUM ENTROPY

Davide Gabrielli, A.A. 2022/23

The program will be a suitable selection of the topics below:

- Generalities: entropy, relative entropy and properties; Reny entropy, Von Neumann entropy, Fisher information.
- Entropy and information: entropy and data compression, entropy and transmission on noisy channels.
- Entropy and statistical mechanics: variational principles, Gibbs measures, Shannon McMillan Breiman's theorem, entropy density for infinite spin systems on a lattice, entropy and distances.
- Entropy and large deviations: elements of ergodic theory, frequencies, empirical measures and processes, method of types , relative entropy and large deviations, Sanov theorem.
- Quantum entropy: quantum statistical states, density matrices, Von Neumann entropy, distances between quantum states.

Some reference texts will be

1. Den Hollander, Large deviations
2. Shields, Ergodic theory of discrete sample paths
3. Rassoul-Agha Seppalainen, A course on large deviations with an introduction to statistical mechanics
4. Cover Thomas, Elements of information theory
5. Nielsen Chuang, Quantum computation and quantum information theory

Lectures will be in precence and also stremed on the TEAMS Classic and quantum entropy code channel gfeclyv

The schedule of the lectures is fixed each week, next lecture is planned on friday march 24 14.30–16.30 room A1.2 blocco zero.

People interested in the course should write to davide.gabrielli@univaq.it asking to be added to the mailing list of the course.