

Statistical physics of tailored random graphs: entropies, processes, and generation

Overview

ACC Coolen, King's College London

- I. Mathematical concepts and tools**, about 0.5 hrs
delta function, Gaussian integrals, steepest descent, exponential distributions and generating functions, the replica method, statistical mechanics of complex systems
- II. Tailored sparse random graphs**, about 2 hrs
tailoring random graphs, entropy and complexity, numerical generation of graphs, degree-constrained MCMC dynamics of directed and nondirected graphs
- III. Ising spin models on tailored random graphs**, about 1.5 hrs
Averaging over graphs using replica method, averaged free energy, graph ensemble entropy, replica symmetric theory and phase diagrams (including all tricks)
- IV. hands-on session: coupled oscillators on random graphs**
- V. New research: replica methods for loopy networks and graphs**, about 1.5 hrs