« École sur les mathématiques de la mécanique statistique hors d'équilibre,
à l'occasion du 60e anniversaire de Claude-Alain Pillet »
24 au 26 octobre 2018

"School on Mathematics of Non-equilibrium Statistical Mechanics,
on the occasion of the sixtieth birthday of Claude-Alain Pillet"
October 24-26, 2018

Celebrating Claude-Alain

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In absence of almost any work of my own in Claude-Alain's subjects, I will talk about two pieces of work which deal with (classical) non-equilibrium problems.

The first is a study about the

Dynamics of chemical networks

which formed the PhD of Andrea Agazzi (Duke, NYU) (work with Amir Dembo (Stanford)). The question is how the differential equations of chemical networks (with sources) are approximated when one takes into account the particle nature of the chemical ingredients. A "large deviation principle" can be shown, but there are interesting issues of what happens when some chemical species disappear completely.

The second is

Protein: the physics of amorphous learning matter

This is work with Jacques Rougemont (Geneva) and Tsvi Tlusty (Ulsan). The greater context is an attempt to bring the language of mathematics closer to that of biology, where there exist lots of data but few conceptual methods. Considering the evolution of functional proteins (which do something useful), we view them as amorphous solids. It turns out that describing the protein as a (finite) random network of connections, which are changed through evolution, a Green's function approach can explain many properties of proteins which biologists have observed. The talk needs no previous knowledge of biological concepts.

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