

G. Gallavotti, "Non-equilibrium ensembles: NS example"

How to formulate a theory of ensembles analogous to that for the equilibrium ensembles (eg. canonical or microcanonical ensembles) to describe the stationary states out of equilibrium? A proposal is suggested by the example of the Navier-Stokes equation. The NS equation will be considered for an incompressible fluid in a periodic box and subject to a stirring force constant in time and acting at large scale (ie at the scale of the container). Stationary states depend on a single parameter R =Reynolds number= inverse of viscosity and for a family E of probability distributions on the velocity fields. The possibility of existence of other equations whose stationary states have -exactly- the same distributions through a mechanism analogous to that for the equivalence of equilibrium states of different ensembles (which will be proposed to be similar to the equivalence in the thermodynamic limit which in the NS case will correspond to the ultraviolet regularization $N \rightarrow$ infinity).