DIFFERENTIAL GEOMETRY/PDE SEMINAR

Wednesday, March 7, 2007
Padelford C-36
3:50-5pm

Dissipative Gaussian thermostats

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Gaussian thermostats provide interesting models in nonequilibrium statistical me chanics. Given a closed Riemannian manifold (M, g) and a vector field E (the external field) on M, the Gaussian thermostat (or isokinetic dynamics) is given by the differential eq uation

$$\frac{D\dot{\gamma}}{dt} = E(\gamma) - \frac{\langle E(\gamma), \dot{\gamma}\rangle}{|\dot{\gamma}|^2}\,\dot{\gamma},$$

where D denotes covariant derivative and $\gamma : \mathbb{R} \to M$ is a curve in M. This equation defines a flow ϕ on the unit sphere bundle SM of M which reduces to the geodesic flow when $E = 0$.

In general, Gaussian thermostats are not volume preserving, and this talk will present joint results of the speaker and G. Paternain on characterization of those Anosov Gaussian thermostats which do not preserve any smooth measure. Such dynamical systems are called dissipative. Dissipativity of a thermostat relates closely to positivity of entropy production in it and solvability of the cohomological equation

$$Xu = \theta,$$

where X is the generator of the flow ϕ on SM and θ is the 1-fo rm dual to E.

For more information about this seminar, visit the DG/PDE Seminar Web page (from the Math Department home page, `www.math.washington.edu`, follow the link **Seminars, Colloquia, and Conferences**).

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