

## Boris Gershgorin

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will speak on

### Climate response and fluctuation–dissipation theorem

ABSTRACT: The fluctuation-dissipation theorem (FDT) provides an attractive perspective to address climate change in an atmosphere–ocean system (AOS).

The theorem states that in order to predict the linear response of a dynamical system in equilibrium to a small perturbation in external forcing, it is sufficient to find the appropriate correlation function in equilibrium without the need for perturbing the system. An attractive feature of applying the FDT to low-frequency climate variables of an AOS is that the linear response operator computed by the theorem can then be utilized for multiple climate change scenarios without the need of running the complex climate model in each individual case. In this talk, we focus on the performance of FDT and its approximations in predicting climate change in idealized models. On the one hand these models are simple enough to be solved either analytically or numerically and on the other hand they mimic some of the key properties of a complex AOS. In particular, we consider three different nonlinear test models that allow us to investigate such important practical issues of assessing climate change via FDT as the performance of linear regressions, the subtle departures from Gaussianity and the time–dependent statistics in the model.

The results of our study should provide useful guidelines for applying the FDT to more complex realistic systems.

WEDNESDAY, 27 JANUARY 2010

LECTURE AT 4:00 PM

COFFEE, TEA, AND REFRESHMENTS FROM 3:30-5 PM

ROOM 617, WACHMAN BUILDING

DEPARTMENT OF MATHEMATICS