

Fractal and Power Spectrum Characterizations of On-Off Intermittency*[†]S.C. Venkataramani, T.M. Antonsen, Edward Ott

University of Maryland

and

John C. Sommerer

Johns Hopkins Applied Physics Laboratory

Some dynamical systems possess invariant submanifolds such that the dynamics restricted to the invariant submanifold is chaotic. This situation arises in systems with a spatial symmetry. The invariant submanifold could become unstable to perturbations in the transverse directions when a parameter of the system is changed through a critical value. This could result in an extreme form of temporally intermittent bursting called *on-off intermittency*.

We study a model that incorporates the universal features of systems that display on-off intermittency. We solve this model both with and without additive noise and we derive scaling results for the power spectral density of the on-off intermittent process and for the box counting dimension for the set of time interval when the process takes on values above a given threshold. We then study a numerical ordinary differential equation example with symmetry and verify our scaling results.

*Characterization of On-Off Intermittency S.C. Venkataramani, T.M. Antonsen, E. Ott and J.C. Sommerer, preprint 1995, to be published.

[†]Talk presented by E. Ott.