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Fisher Zeros of Six-state Clock Model on a Square Lattice  

We investigate the phase transitions of the six-state clock model with nearest neighbour interactions on a square lattice. We obtain the density of states via Wang-Landau algorithms and study Fisher zero to get phase transition temperatures.

Strange Nonchaotic Bursting in Quasi-periodically Forced Neural Oscillators  

We study the neural bursting activity (alternating between a silent phase and a bursting phase of repetitive spiking) in an illustrative Hindmarsh-Rose model. In addition to the usual periodic and chaotic bursting, a new type of strange nonchaotic bursting is found to occur in the quasiperiodically forced case. This strange nonchaotic bursting may appear through a transition from a silent state. Using a rational approximation to the quasiperiodic forcing, the mechanism for the occurrence of such a strange nonchaotic bursting is investigated. These strange nonchaotic burstings are characterized in terms of the interburst intervals, the bursting length (i.e., the time interval between the first and last spikes in each burst), the number of spikes in each burst, and the peak to base ratios in the power spectra. The effect of noise on this strange nonchaotic bursting state is also studied. Finally, a transition from a bursting to a beating (continuous spiking) is briefly discussed.

The Effect of Mode Coupling in Coupled Dielectric Microdisks  

We study the mode coupling between quasi-eigenmodes in coupled dielectric microdisks. The positions in complex energy plane of modes and the corresponding mode distributions in real spaces obtained according to variation of inter-disk distance and size difference between two microdisks. The interesting phenomena such as the directional emission and avoided resonance crossing can be explained by mode coupling.

Modeling and Solutions of Queue Systems in Human Dynamics  

The dynamics of queue has been intensively studied by the needs in the fields of computer sciences, massive manufacturing managements, and so on. In traditional models, the number of events coming into the system in unit time is assumed to be randomly distributed and thus well approximated by Poisson processes. On the other hand, the analysis of real human activity data such as e-mail corresponding logs and wireless communication archives shows that the number of input events follows power law, and hence here we introduce a generalized queue model whose number of input tasks is given by a power law. Also we consider the case that the queueing dynamics is performed based on priority instead of first-in-first-out protocol. We present numerical result and compare it with the first passage time distribution of Levy flight random walks.

Influence of ocean bottom topography on the characteristics of edge waves  

As an ocean surface wave approaches a plane sloping beach, some of its energy is trapped near the shoreline and excites an edge wave at well-defined resonance frequencies. We investigate the influence of ocean bottom topography on the characteristics of edge waves, using an exact method based on the invariant imbedding theory. When the ocean depth increases linearly with the distance from the beach, our results agree very well with known analytical solutions. We find exact solutions for the edge wave frequencies and field distributions, when the ocean