Final report of Chaos Team

(Quasiperiodicity and Mode Locking in The Circle Map)

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1. Quasiperiodicity and Mode Locking in The Circle Map

We study quasiperiodicity and mode locking the circle map. For the subcritical region, the periodic state with the locked frequency exists in the Arnold tongue. When nonlinearity parameter (K) equals to 0, the measure of quasiperiodic state with irrational winding number is 1. As nonlinearity parameter (K) increases form 0 to 1, the measure of the Quasiperiodic state decrease but the measure of the mode-locked state increases monotonically. Through the critical line (K=1), the overlap of tongues give rise to break-up of the quasiperiodic state and transition to chaos occurs. In the parameter space, swallow tail structure in the Arnold tongue exhibit self-similarity, and in which period-doubling transition to chaos occurs

We understand the mode-locking, quasiperiodic rout to chaos in the circle map.

2.Effect of Noise on The Period Doubling Transition to Chaos in The Stochastic Systems. We study effect of noise on the period-doubling systems. We summarize the scaling properties of the bicritical dynamics in the unidirectionally coupled period-doubling systems in the presence of noise. At present we study the scaling properties of the bicritical point, we will investigate the effect of noise about unidirectionally coupled 1D maps.