Contributed Talk

Coupled Lorenz Systems near Hopf Boundary: Multistability, Intermingled Basins and Chimeras

Sangeetha Ujjwal

Banaras Hindu University, Varanasi, India

Lorenz equations model the convective flow in atmospheric layers and is an archetypal model to study chaos. In the Lorenz system, when the parameters σ, β and ρ are set to the standard values 10, 8/3 and 28 respectively, almost all initial conditions asymptote to the butterfly shaped chaotic attractor. The dynamics of the coupled system become more interesting when ρ is chosen just above the Hopf bifurcation ($\rho = 24.74$). There is a coupling induced multistability wherein in addition to the usual butterfly shaped attractor other chaotic attractors and fixed points emerge for a given parameter set. The basins of these different attractors are intertwined in complicated structures. The dynamics on some of these attractors are synchronized while on others it is desynchronized leading to chimera-like states when an ensemble of such oscillators are considered. Depending upon the nature of coupling hyper-chaotic trajectories can also be observed in such systems.