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Noise-driven order via multiple scales

Transient or unstable behavior is often ignored in considering long time dynamics in the deterministic world. However, stochastic effects can change the picture dramatically, so that apparently stabilized transients can dominate the long range behavior. This talk will show how this theme appears in seemingly unrelated different applications, including delay-driven vibrations and infectious disease. Some canonical models are compared, illustrating how hidden time scales play an important role in noise-driven regular behavior, such as coherent oscillations, synchronization, and even quiescence. Different perspectives on coherence resonance show that the order in these models can be attributed to transients “stabilized” by stochastic effects, suggesting a new analysis on reduced models to better understand and predict these phenomena.