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Complex dynamics and bifurcations of a synthetic drug model with psychosocial and environmental influence

Synthetic drug addiction is a growing global problem. In this talk, we establish a synthetic drug model with psychosocial and environmental influence. Meanwhile, our model also incorporates relapse and drug supply chain functions. From the dynamic analysis of this model, we find the system may have many rich dynamical phenomena including saddle-node bifurcation, Hopf bifurcation, and elliptic type nilpotent singularity bifurcation of codimension 3. We also present the bifurcation diagram, corresponding phase diagrams and give some epidemiological explanations for these complex dynamics phenomena. This is joint work with Prof. Huaiping Zhu.