

Dynamical Systems II 1914651

Credit: 4

Outline of the course

1. One-Parameter bifurcations of fixed points in discrete-time systems, including saddle-node, Flip and Neimark-Sacker bifurcation.
2. Differential equations on torus, rotation number, quasiperiodicity, Bifurcations of periodic orbits into tori,
3. Smale horseshoes, Hyperbolic sets, Markov partitions and strange attractors.
4. Orbits homoclinic to hyperbolic fixed points in three-dimensional autonomous vector fields, Lorenz bifurcations, Silnikov example.
5. Methods of averaging, Melnikov methods, Perturbation of planar homoclinic and periodic orbits.
6. Local codimension two Bifurcations of flows

References

1. Guckenheimer, J.; Holmes, P.; Nonlinear Oscillations, Dynamical Systems and Bifurcations of Vector Fields, Springer-Verlag, New York, 1988.
2. Wiggins, S.; Introduction to Applied Nonlinear Dynamical Systems and Chaos, Springer-Verlag, New York, 1990.
3. Kuznetsov, Y. A.; Elements of Applied Bifurcation Theory, Springer-Verlag, New York, 1995.