

DYNAMICAL SYSTEMS AND CHAOS

Undergraduate Seminar No. 77638

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Syllabus

1. Dynamical systems and phase space: introduction
2. Fixed points and linear stability analysis
3. Nonlinear oscillator
4. Resonance in a nonlinear oscillator
5. Auto-oscillations: limit cycle
6. Bifurcations in one and two dimensions
7. Chaos in the Henon-Heiles Hamiltonian
8. Kicked rotor: standard map
9. Logistic map - 1
10. Logistic map - 2
11. Fractals. Fractal dimension
12. Chaotic attractors. Lyapunov exponents