

Classical and Quantum Nonlinear Dynamics, Frühjahrssemester 2025

Points that you will (hopefully) understand by the end of the course

- (1) Can a limit cycle exist in a linear system?
- (2) Can there be an “8”-shaped limit cycle in a two-dimensional system? In higher dimensions?
- (3) Can a system with two degrees of freedom exhibit chaotic behavior? Give your reasons.
- (4) Difference between “attracting” and “Lyapunov stable”.
- (5) Difference between a pitchfork bifurcation and a Hopf bifurcation.
- (6) Discuss the order parameter of the Kuramoto model.
- (7) Kuramoto model: discuss the effect of different distribution functions of the natural frequencies.
- (8) How can dissipation be treated in a quantum system?
- (9) Transformation to a rotating frame vs. “Rotating wave approximation”.
- (10) “Trajectories cannot intersect”. What about homoclinic fixed points?
- (11)
- (12)
- (13)