INTRODUCTION TO NONLINEAR PHYSICS

SYLABUS

Łukasz A. Turski

CFT PAN
SPRING SEMESTER
2024

1) General introduction
2) Short introduction to mathematical tools:
   (I) Classical mechanics :
      a. Symplectic dynamics
      b. Dissipative dynamics
      c. Metriplectic dynamics
   (II) Quantum generalization
   (III) Thermodynamics
      a. Laws of thermodynamics
      b. Discussion of the Second Law
      c. Thermodynamic Stability
3) Systems with discrete number of degrees of freedom:
   (I) Linear stability, fixed points, bifurcation
4) Continuous systems:
   (I) Classical examples
   (II) Broken symmetries
   (III) Magnetic manifolds
5) Conclusions