LECTURE 1. INTRODUCTION

DYNAMICAL SYSTEMS (110.421)
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1. General Information

1.1. **Course Arrangement.** The course homepage is at

`http://www.math.jhu.edu/~qzhang/courses/2008Spring/421/index.html`

The homework will be collected in the Tuesday classes, and the graded homework sheets will be returned one week later. Sufficient practice in homework is essential to master this course, so you are highly recommended to try, with the assistance from our TA, from our Helproom at Krieger 213 and from your friends, to complete every assignment.

There will be one in-class midterm exam on March 25, and a 3-hour final exam on May 11. If you have special needs, please let me know as early as possible. The grading policy is specified in our course syllabus. In particular, please pay attention to our policy for absence from exams.

1.2. **Course Requirements.** The academic prerequisites for this course include a moderate knowledge of calculus, linear algebras, and complex numbers.

In this course, our emphasis will be place on

- the primitive ideas behind basic theories;
- the pitfalls for basic concepts and theorems;
- the explicit calculations for computational results;
- the rigorous proofs for selected theorems.

2. Introduction to Dynamic Systems

In a most general setting, a *dynamical system* is a triple $(\mathcal{S}, \mathcal{T}, \Phi)$, where $\mathcal{S}$ is a set called the *state space* or *phase space*, $\mathcal{T}$ is a set of numbers called the *parameter space*, and $\Phi : \mathcal{S} \times \mathcal{T} \to \mathcal{S}$ is a map called the *evolution map*.

dynamical system
state space
phase space
parameter space
evolution map

Given a dynamical system $(\mathcal{S}, \mathcal{T}, \Phi)$, our main interest is in its asymptotic behavior. Note that every dynamical system is completely deterministic, and the chaotic behavior of some dynamical systems is not due to their uncertainties but to their intrinsic complexity.

3. Homework

In this class, we have learned to

- have an intuitive understanding for the definition of dynamical systems.

There is no homework for today.