

Topics for Exam 1**1. Fundamental Existence, Uniqueness and Continuity Theory**

- 1.1 Local Existence and Uniqueness Theorem
- 1.2 Extension of Solutions
- 1.3 Continuous Dependence on Initial Conditions
- 1.4 Global existence results

2. Continuous Dynamical Systems

- 2.1 Flow domains and flow maps of C^1 vector fields
- 2.2 Definition of Continuous Dynamical Systems
- 2.3 Orbits
- 2.4 Invariant sets
- 2.5 Singular points

Relevant sections in the text: Sections I.1, I.2, I.3, I.4, I.7 and I.8.

Relevant chapters in the online class notes: Chapters 2, 3 and 4.

Important Concepts: Flow domain, flow map, continuous dynamical systems, orbits, invariant sets, singular points.

Important Skills: Know how to apply the local existence and uniqueness theorem; know how to apply the global existence results proved in class; know how to apply the escape in finite time theorem; know how to apply the continuous dependence on initial conditions results; know how to compute flow domains and flow maps of vector fields; know how to compute orbits of flows; know how to show whether or not a set is invariant under a flow.