

Topics in Nonlinear Functional Analysis

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Presentation Overview

- 1 The Hahn-Banach Theorems and the Weak Topology
- 2 Weak Topologies and Uniform Convexity
- 3 Smoothness, Differentiability, and Operators of Monotone Type
- 4 Differential Equations of Monotone Type

The Hahn-Banach Theorems and the Weak Topology

- The analytic form of the Hahn-Banach Theorem

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- The geometric form of the Hahn-Banach Theorem
- Weak topologies

Weak Topologies and Uniform Convexity

- The weak topology in the infinite-dimensional spaces

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- The weak topology in the infinite-dimensional spaces
- Case study: convex hull of directed weak compact sets

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- Case study: convex hull of directed weak compact sets
- Hyperplanes in the Weak-* Topology

Weak Topologies and Uniform Convexity

- The weak topology in the infinite-dimensional spaces
- Case study: convex hull of directed weak compact sets
- Hyperplanes in the Weak- $*$ Topology
- Reflexive and uniformly convex spaces

Smoothness, Differentiability, and Operators of Monotone Type

- Gâteaux and Fréchet differentiability, and continuity of duality mappings

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- Gâteaux and Fréchet differentiability, and continuity of duality mappings
- Subdifferentials and maximal monotone operators in Banach spaces

Smoothness, Differentiability, and Operators of Monotone Type

- Gâteaux and Fréchet differentiability, and continuity of duality mappings
- Subdifferentials and maximal monotone operators in Banach spaces
- m -accretive operators in smooth spaces

Differential equations of monotone type

- First order Cauchy problem of monotone type

Differential equations of monotone type

- First order Cauchy problem of monotone type
- Second-order differential equations of monotone type

Differential equations of monotone type

- First order Cauchy problem of monotone type
- Second-order differential equations of monotone type
- Applications