

# spBeamer Demo

## Sweet Pastry

*Fudan University, Shanghai, China*

May 19, 2025

# Summary

## 1 Introduction

## 2 Math

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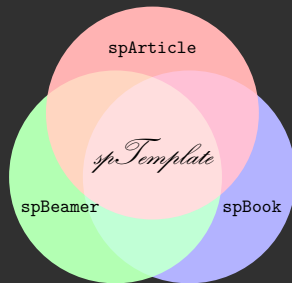
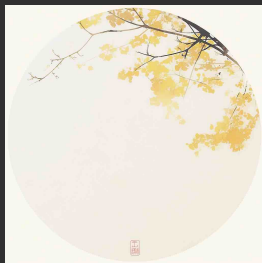
### ■ subsection2

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# Introduction

# Logo



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# uncover command

## Definition (Linear Functional)

A linear functional on a vector space  $X$  over  $\mathbb{R}$  or  $\mathbb{C}$  is a map  $f : X \rightarrow \mathbb{R}$  (or  $\mathbb{C}$ ) such that:

$$f(\alpha x + \beta y) = \alpha f(x) + \beta f(y) \quad \forall x, y \in X, \alpha, \beta \in \mathbb{R} \text{ (or } \mathbb{C})$$

## Definition (Sublinear Functional)

A map  $p : X \rightarrow \mathbb{R}$  is called sublinear if:

$$p(x + y) \leq p(x) + p(y) \quad \text{and} \quad p(\lambda x) = \lambda p(x) \quad \forall x, y \in X, \lambda \geq 0$$

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## Theorem (Hahn-Banach, Normed Space Version)

*Let  $X$  be a normed space,  $M$  a subspace of  $X$ , and  $f : M \rightarrow \mathbb{R}$  a bounded linear functional. Suppose  $p : X \rightarrow \mathbb{R}$  is a sublinear functional such that:*

$$f(x) \leq p(x) \quad \forall x \in M$$

*Then, there exists an extension  $F : X \rightarrow \mathbb{R}$  of  $f$  such that:*

$$F(x) \leq p(x) \quad \forall x \in X$$

*and  $F$  is linear and bounded.*

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chem



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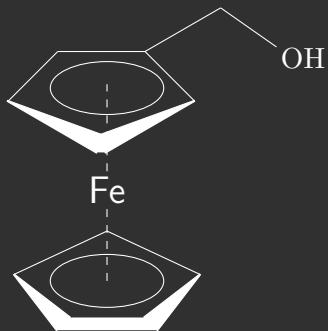
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# References

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# The End