

# Table of Contents

1. **Introduction and Outline**
  - Overview of time-frequency signal analysis
  - Linear signal spaces
  - Objectives and methodology of the book
2. **The Wigner Distribution of a Linear Signal Space**
  - Wigner distribution fundamentals
  - Signal representation in the time-frequency plane
  - Mathematical properties and interpretations
3. **Time-Frequency Localization of Linear Signal Spaces**
  - Localization operators
  - Energy concentration in time-frequency regions
  - Uncertainty relations and localization measures
4. **Time-Frequency Synthesis of Linear Signal Spaces**
  - Signal reconstruction techniques
  - Synthesis methods in linear spaces
  - Basis functions and orthogonal decompositions
5. **Time-Frequency Filters and Time-Frequency Expansions**
  - Design of time-frequency filters
  - High-resolution filtering
  - Expansion methods and signal decomposition
6. **Signal Estimation and Signal Detection**
  - Detection of deterministic and stochastic signals
  - Noise reduction techniques
  - Estimation theory in time-frequency analysis
7. **The Ambiguity Function of a Linear Signal Space**
  - Ambiguity function theory
  - Resolution analysis
  - Radar and sonar signal interpretation
8. **Range-Doppler Estimation**
  - Doppler shift estimation
  - Radar target detection
  - Maximum-likelihood estimation methods
9. **Conclusions**
  - Summary of theoretical contributions
  - Applications in modern signal processing
10. **References and Back Matter**
  - Bibliography
  - Index and supplementary material