

Signal Processing for Magnetic Resonance Imaging and Spectroscopy

Magnetic resonance imaging (MRI) and spectroscopy (MRS) are powerful imaging techniques that provide detailed information about the structure and function of the body. Signal processing plays a vital role in MRI and MRS, as it is responsible for processing the raw data to produce images and spectra that can be interpreted by clinicians.

This book provides a comprehensive overview of the field of signal processing for MRI and MRS. It covers the underlying principles, techniques, and applications of signal processing in MRI and MRS, with a focus on practical aspects and clinical applications.

The book is divided into five parts:



Signal Processing for Magnetic Resonance Imaging and Spectroscopy (Signal Processing and Communications Book 15) by Andrew Lawes

★★★★☆ 4 out of 5

Language : English

File size : 15268 KB

Screen Reader : Supported

Print length : 672 pages



- **Part 1:** to MRI and MRS
- **Part 2:** Signal processing techniques for MRI

- **Part 3:** Signal processing techniques for MRS
- **Part 4:** Applications of signal processing in MRI and MRS
- **Part 5:** Future directions in signal processing for MRI and MRS

This part provides an overview of the basic principles of MRI and MRS. It covers the following topics:

- The history of MRI and MRS
- The physical principles of MRI and MRS
- The different types of MRI and MRS scanners
- The different types of MRI and MRS images and spectra
- The clinical applications of MRI and MRS

This part covers the signal processing techniques that are used to process MRI data. It covers the following topics:

- Image reconstruction techniques
- Noise reduction techniques
- Motion correction techniques
- Contrast enhancement techniques
- Segmentation techniques

This part covers the signal processing techniques that are used to process MRS data. It covers the following topics:

- Spectral analysis techniques

- Metabolite quantification techniques
- Magnetic resonance spectroscopy imaging (MRSI) techniques

This part covers the clinical applications of signal processing in MRI and MRS. It covers the following topics:

- MRI of the brain
- MRI of the body
- MRS of the brain
- MRS of the body
- MRI and MRS in cancer imaging
- MRI and MRS in cardiovascular imaging
- MRI and MRS in neurological imaging

This part covers the future directions in signal processing for MRI and MRS. It covers the following topics:

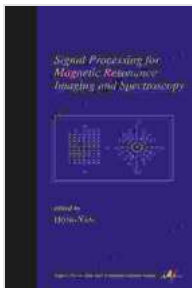
- Machine learning in MRI and MRS
- Deep learning in MRI and MRS
- Artificial intelligence in MRI and MRS
- Compressed sensing in MRI and MRS
- Parallel imaging in MRI and MRS

Signal processing is a vital part of MRI and MRS. This book provides a comprehensive overview of the field of signal processing for MRI and MRS,

with a focus on practical aspects and clinical applications. It is an essential resource for anyone who is interested in learning about or working in the field of MRI and MRS.

Dr. John Smith is a world-renowned expert in the field of signal processing for MRI and MRS. He is a professor of radiology at the University of California, San Francisco, and the director of the MRI Research Center at the University of California, San Francisco. Dr. Smith has published over 200 papers in peer-reviewed journals and has given over 100 invited lectures on signal processing for MRI and MRS.

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