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Nota di contenuto	Front cover; Introduction to Diffusion Tensor Imaging; Copyrightpage; Contents; Preface; ACKNOWLEDGEMENTS; Chapter 1: Basics of diffusion measurement; 1.1 NMR SPECTROSCOPYANDMRI CAN DETECT SIGNALS FROM WATER MOLECULES; 1.2 WHAT IS DIFFUSION?; 1.3 HOW TO MEASURE DIFFUSION?; Chapter 2: Anatomy of diffusion measurement; 2.1 A SET OF UNIPOLAR GRADIENTS AND SPIN-ECHO SEQUENCE IS MOST WIDELY USED FOR DIFFUSION WEIGHTING; 2.2 THERE ARE FOUR PARAMETERS THAT AFFECT THE AMOUNT OF SIGNAL LOSS; 2.3 THERE ARE SEVERAL WAYS OF ACHIEVING A DIFFERENT DEGREE OF DIFFUSION WEIGHTING Chapter 3: Mathematics of diffusion measurement3.1 WE NEED TO CALCULATE DISTRIBUTION OF SIGNAL PHASES BY MOLECULAR MOTION; 3.2 SIMPLE EXPONENTIAL DECAY DESCRIBES SIGNAL LOSS BY DIFFUSION WEIGHTING; 3.3 DIFFUSION CONSTANT CAN BE OBTAINED FROM THE AMOUNT OF SIGNAL LOSS BUT NOT FROM THE SIGNAL INTENSITY; 3.4 FROM TWO MEASUREMENTS, WE CAN OBTAIN A DIFFUSION CONSTANT; 3.5 IF THERE ARE MORE THAN TWO MEASUREMENT POINTS, LINEAR LEAST-SQUARE FITTING IS USED; Chapter 4: Principle of diffusion tensor imaging; 4.1 NMR/MRI CAN MEASURE DIFFUSION CONSTANTS ALONG AN ARBITRARY AXIS 4.2 DIFFUSION SOMETIMES HAS DIRECTIONALITY4.3 SIX PARAMETERS

ARE NEEDED TO UNIQUELY DEFINE AN ELLIPSOID; 4.4 DIFFUSION TENSOR IMAGING CHARACTERIZES THE DIFFUSION ELLIPSOID FROM MULTIPLE DIFFUSION CONSTANT MEASUREMENTS ALONG DIFFERENT DIRECTIONS; 4.5 WATER MOLECULES PROBE MICROSCOPIC PROPERTIES OF THEIR ENVIRONMENT; 4.6 HUMAN BRAIN WHITE MATTER HAS HIGH DIFFUSION ANISOTROPY; Chapter 5: Mathematics of diffusion tensor imaging; 5.1 OUR TASK IS TO DETERMINE THE SIX PARAMETERS OF A DIFFUSION ELLIPSOID; 5.2 WE CAN OBTAIN THE SIX PARAMETERS FROM SEVEN DIFFUSION MEASUREMENTS  
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Chapter 7: New image contrasts from diffusion tensor imaging: theory, meaning, and usefulness of DTI-based image contrast  
7.1 TWO SCALAR MAPS (ANISOTROPY AND DIFFUSION CONSTANT MAPS) AND FIBER ORIENTATION MAPS ARE IMPORTANT OUTCOMES OBTAINED FROM DTI; 7.2 SCALAR MAPS (ANISOTROPY AND DIFFUSION CONSTANT MAPS) AND FIBER ORIENTATION MAPS ARE TWO IMPORTANT IMAGES OBTAINED FROM DTI; 7.3 THERE ARE TUBULAR AND PLANAR TYPES OF ANISOTROPY; 7.4 DTI HAS SEVERAL DISADVANTAGES; 7.5 THERE ARE MULTIPLE SOURCES THAT DECREASE ANISOTROPY; 7.6 ANISOTROPY MAY PROVIDE UNIQUE INFORMATION  
7.7 COLOR-CODED MAPS ARE A POWERFUL VISUALIZATION METHOD TO REVEAL WHITE MATTER ANATOMY

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## Sommario/riassunto

The concept of Diffusion Tensor Imaging (DTI) is often difficult to grasp, even for Magnetic Resonance physicists. Introduction to Diffusion Tensor Imaging uses extensive illustrations (not equations) to help readers to understand how DTI works. Emphasis is placed on the interpretation of DTI images, the design of DTI experiments, and the forms of application studies. The theory of DTI is constantly evolving and so there is a need for a textbook that explains how the technique works in a way that is easy to understand - Introduction to Diffusion Tensor Imaging fills this gap.<br>

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