

Table of Contents

Foreword	8
Chapter I Introduction	10
1 Book Design.....	17
Basic Factors Iterated	21
Electrodes, Amplifiers and Montages	22
2 Basic Concepts.....	24
Localization of EEG	30
Chemical and Electrical Synapses	35
Frequencies & Amplitude of the EEG	38
Stochastic Resonance	57
Clusters, Hubs and Functional Modules	60
In-Phase vs Anti-Phase	75
Homeostasis and Phase Reset	81
Tomography and Functional Modules (tEEG)and (BET)	86
Z Scores and a Reference Normal Populations	86
EEG Biofeedback or Neurofeedback	88
Model Building and the Human Electroencephalogram	89
3 How to Record EEG.....	96
Scalp Electrodes	98
Amplifiers	99
Amplifier Matching	102
Electrode Placement	105
4 Artifact Rejection.....	108
5 Certification in EEG & QEEG.....	115
Certification in Conventional Visual EEG	118
Certification in Quantitative EEG	119
Certificaton in EEG Biofeedback	122
Chapter II Quantitative EEG	126
1 Montages.....	132
Matrix Representation of Montages	133
Common Reference Recordings	135
Bipolar Recording Montage	139
Average Reference Recordings	142
Laplacian Current Density Recording	143
Reference Electrode Standardization	146
2 Test-Retest Reliability.....	147
3 qEEG Normative Databases.....	148
Simultaneous 'Eye Ball' EEG & Normative Databases	150
Inclusion/Exclusion Criteria and "Representative Samples"	154
Amplifier Matching	154
Artifact Free Data and Reliability Measures	155
Cross-Validation Tests of a Normative Database	155
Age Stratification vs. Age Regression	162
Sample Size per Age Group	162

LORETA Normative Databases	163
Z-Score EEG Biofeedback	166
Active Tasks vs Resting EEG	168
Gold Standards of EEG 'Reference' Normative Databases	169
Planned Comparisons	171
Effects of Medication	173
4 Clinical Interpretation.....	174
Chapter III Phase Reset	181
1 Neurophysiological Mechanisms.....	190
2 Phase Reset and Intelligence.....	201
3 Phase Reset and Autism	209
4 Phase Reset and Brodmann Areas.....	215
5 Cross-Frequency Phase Reset.....	226
Chapter IV EEG Tomography (tEEG)	236
1 Inverse Solutions and Electrical Neuroimaging.....	242
2 Local and Distant Connectivity	254
3 tEEG Source Correlation.....	272
4 tEEG Normative Data	273
Chapter V Functional Networks	281
1 Functional Modules.....	286
2 Brodmann Areas.....	301
3 BrainMap-Behavioral Intrinsic Connectivity.....	324
4 Neuropsychological Cortical Linkages.....	343
Chapter VI EEG Biofeedback	379
1 History.....	381
2 General Theory of EEG Biofeedback.....	387
3 Z Score Biofeedback.....	408
4 Symptom Check List.....	413
Chapter VII Tutorials	426
1 Download Demo & Files.....	427
Download Demo	428
Import EEG & Files	430
2 Visual Examination.....	433
Montages	439
3 Artifact Rejection.....	444
Artifact Rejection (Omission Method)	444
Artifact - Reconstruction	453
Drowsiness Exercises	457
Vigilance, Sleep and EEG Stability	463
Drug Effects	468

4 Reliability & Validity.....	470
Reliability Exercises	478
Z Score Validity	481
Planned Comparisons - Surface EEG	491
Planned Comparisons - LORETA	493
5 Burst Metrics.....	496
Infra-Slow Frequencies	500
6 Phase Reset.....	503
Straightened Phase	509
Instantaneous Phase Difference	510
Phase Reset and Interhemispheric Dynamics	511
7 Cross-Frequency Synchrony.....	513
8 Bi-Spectral Analyses.....	521
Bi-Spectral Analyses -Power	522
Bi-Spectral Analyses – Coherence	525
Bi-Spectral Analyses– Phase Difference	527
Bi-Spectral Analyses– Phase Reset	528
9 EEG Tomography.....	529
LORETA Time Domain	533
LORETA Z vs Raw Values	538
LORETA Source Correlations	543
10 JTFA	548
Complex Demodulation	549
Gabor Adaptive Spectrogram	555
11 Clinical Report Writing.....	557
Clinical History	559
Hypotheses Testing	565
Artifact Rejection	566
Report Creation	575
Linked Ears Montage.....	575
Laplacian Montage.....	580
tEEG LORETA.....	582
Final Report.....	586
12 Clinical Examples.....	587
Epilepsy	589
Chronic Pain	601
Stroke	605
Traumatic Brain Injury	618
13 Biofeedback.....	638
Biofeedback - Surface EEG	639
Biofeedback - LORETA Sources	652
14 Signal Generator.....	666
Auto-Spectrum	674
Cross-Spectrum	678
FFT Coherence and Phase Difference	680
Coherence and Amplitude Independence	683
Test of Phase Distortion	684
Burst Duration, Amplitude and Intervals	689
Instantaneous Power	692
Preservation of Phase Difference	699

Phase Distortions Laplacian Reference	701
Phase Distortions Average Reference	702
Chapter VIII References	705
Index	767