

G. T. Herman A. K. Louis F. Natterer (Eds.)

Mathematical Methods in Tomography

Proceedings of a Conference held in
Oberwolfach, Germany, 5-11 June, 1990

Springer-Verlag

Berlin Heidelberg New York
London Paris Tokyo
Hong Kong Barcelona
Budapest

Table of Contents

Theoretical Aspects

Helgason's support theorem for Radon transforms – a new proof and a generalization J. Boman	1
Singular value decompositions for Radon transforms P. Maaß	6
Image reconstruction in Hilbert space W.R. Madych	15
A problem of integral geometry for a family of rays with multiple reflections R.G. Mukhometov	46
Inversion formulas for the three – dimensional ray transform V.P. Palamadov	53

Medical Imaging Techniques

Backscattered Photons — are they useful for a surface – near tomography V. Friedrich	63
Mathematical framework of cone beam 3D reconstruction via the first derivative of the Radon transform P. Grangeat	66
Diffraction tomography : some applications and extension to 3D ultrasound imaging P. Grassin, B. Duchene, W. Tabbara	98
Diffuse tomography : a refined model F.A. Grünbaum	106
Three dimensional reconstructions in inverse obstacle scattering R. Kress , A. Zinn	112
Mathematical questions of a biomagnetic imaging problem A.K. Louis	126

Inverse Problems and Optimization

On variable block algebraic reconstruction techniques Y. Censor	133
On Volterra – Lotka differential equations and multiplicative algorithms for monotone complementary problems P.P.B. Eggermont	141
Constrained regularized least squares problems T. Elfving	153
Multiplicative iterative methods in computed tomography A. de Pierro	167
Remark on the informative content of a few measurements P.C. Sabatier	187

Applications

Theorems for the number of zeros of the projection radial modulators of the 2D – exponential Radon transform W.G. Hawkins, N.C. Yang, P.K. Leichner	194
Evaluation of reconstruction algorithms G.T. Herman, D. Odhner	215
Radon transform and analog coding H. Ogawa, I. Kumazawa	229
Determination of the specific density of an aerosol through tomography L.R. Oudin	242
Computed tomography and rockets E.T. Quinto	261