

An Introduction to Tomography Applications to Medicine, other subjects and Ray/Radon Transforms*

Nandakumaran, A. K.
Department of Mathematics
Indian Institute of Science
Bangalore- 560 012
India.
Email: nands@iisc.ac.in

Abstract

Tomography is a cross sectional imaging of an object or tissue from the mathematical modeling and measured experimental data. The study of tomography involves mathematical modeling, analysis, development of numerical algorithms, its implementation and experimental validation. These problems lead to a class of inverse problems, where the mathematical analysis and computations are rather complicated, but has tremendous applications in various branches of science including medical applications like CT Scan and other areas. It is truly a multi-disciplinary area and requires help from experts on various subjects.

In this talk, we will give a general introduction to various tomographies across disciplines, issues encountered and we model an application from X-ray tomography. We introduce Ray and Radon transforms in the context of Tomographic reconstruction. We will see how Fourier transform is used in inverting the Radon Transform. This demonstrates the advantage modern mathematics in applications of interest. Most of the talk will be addressed to cater the general audience both from engineering and science. Indeed if time permits, we may discuss other tomographies.

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