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Book Review

Applied Inverse Problems, edited by P.C. Sabatier. Lecture Notes in Physics 85, 425 S., Springer, Berlin Heidelberg New York, 1978

The book evolved from a workshop on applied inversion problems organized by the CNRS in Montpellier 1978. The lecture notes deal with quite different aspects of applied inverse problems in various scientific fields, whenever a number of local parameters of a physical system must be deduced from a set of measured data such as geophysics, optics, quantum mechanics, particle field theory.

After an introduction to general aspects of inverse theory and an overview of the methods of inversion and its fields of application about 20 lecture notes on applied but as well on theoretical inverse problems are reprinted. 6 of them deal with geophysical applications in seismology, gravity, magnetotelluric and electromagnetic prospection. These include mostly linear inversion methods, the properties of which are fairly well understood up to now but nonlinear aspects are treated as well, i.e., the determination of seismic foci and of the electric conductivity. As the lectures are given by authors working in the respective fields, they are highly specified. The same is true for the useful understanding of the other lectures mostly treating scattering problems in quantum mechanics and particle field theory. Finally some lectures deal with the mathematical aspects of inverse theory (e.g., the search for solutions of integral and differential equations arising mainly in these fields outside geophysics).

In conclusion, I can say that the book gives a good overview of applied (and theoretical) inverse problems for the scientist working in one of these fields and who is willing to overclimb the high mathematical cliffs which encompass this rather new research field. For the geophysicist who wants to know something about inversion there are a number of publications treating this problem at a lower and maybe more understandable level, lots of them are referenced in this book. Some of the geophysical lectures given here are already published elsewhere so that the geophysicist who wants to do inversion does not get much additional information from this book.

Manfred Koch