Sensitivity Analysis in Remote Sensing

By Eugene A. Ustinov

Springer-Verlag Gmbh Apr 2015, 2015. Taschenbuch. Book Condition: Neu. 23.5x15.5x cm. Neuware - This book contains a detailed presentation of general principles of sensitivity analysis as well as their applications to sample cases of remote sensing experiments. An emphasis is made on applications of adjoint problems, because they are more efficient in many practical cases, although their formulation may seem counterintuitive to a beginner. Special attention is paid to forward problems based on higher-order partial differential equations, where a novel matrix operator approach to formulation of corresponding adjoint problems is presented. Sensitivity analysis (SA) serves for quantitative models of physical objects the same purpose, as differential calculus does for functions. SA provides derivatives of model output parameters (observables) with respect to input parameters. In remote sensing SA provides computer-efficient means to compute the jacobians, matrices of partial derivatives of observables with respect to the geophysical parameters of interest. The jacobians are used to solve corresponding inverse problems of remote sensing. They also play an important role already while designing the remote sensing experiment, where they are used to estimate the retrieval uncertainties of the geophysical parameters with given measurement errors of the instrument, thus providing means for formulations of corresponding...

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