Minisymposium 25 - Inverse Probleme und Inkorrektheits-Phänomene

The Error Localizing Property of Absolutely a-Compatible Operators

BERND BUECHLER (UNIVERSITY OF KAISERSLAUTERN)

On certain function spaces X compactly disturbed multiplication operators $T = \Lambda_a - K : X \to X$ usually lead to ill-posed inverse problems (T, X, X), if the multiplier function a has zeros on its domain of definition. In this context, we present a classification of compact perturbations K in dependence on the multiplier functions a, such that the corresponding ill-posed problems (T, X, X) behave like the reduced ill-posed problems of the form (Λ_a, X, X) with respect to a suitably chosen regularization method. Compact perturbations having the above mentioned property are called absolutely a-compatible – they lead to an error localizing phenomenon, that occurs in the framework of regularizing (T, X, X). We give examples and discuss classes of absolutely a-compatible operators in case of X being the Banach space of continuous functions on a compact interval and in case of X being the Hilbert space of square-integrable functions on a compact interval. Moreover, we explain for a special class of absolutely a-compatible operators the connection with the Lavrentiev resolvent condition. One will see, that dealing with ill-posed inverse problems (T, X, X) there is a strong interaction between multiplication operators, classes of absolutely a-compatible operators and suitably chosen regularization methods.