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Four kinds of expressing solution smoothness and their consequences for ill-posed problems.

In the analysis of ill-posed inverse problems the impact of solution smoothness on accuracy and convergence rates plays an important role. For linear ill-posed operator equations in Hilbert spaces and with focus on the linear regularization schema we will establish relations between the different kinds of measuring solution smoothness in a point-wise or integral manner. In particular we discuss the interplay of distribution functions, profile functions that express the regularization error, index functions generating source conditions, and distance functions associated with benchmark source conditions. Examples exhibit typical situations in applications with compact and non-compact forward operators. This is joint work with Peter Mathé (Berlin) and Jens Flemming (Chemnitz). (Received September 08, 2010)