1023-03-411 **Ulrich Kohlenbach***, Darmstadt University of Technology, Department of Mathematics, Schlossgartenstraße 7, D-64289 Darmstadt, Germany. *Recent Uses of Proof Theory in Nonlinear Analysis and Geodesic Geometry.*

In recent years proof-theoretic metatheorems have been established which provide general methods for the extractability of effective strongly uniform bounds from large classes of proofs in functional analysis and geodesic geometry. 'Strongly uniform' here refers to the fact that the bounds are independent from parameters in abstract classes of spaces as long as some local bounds on certain metric distances are given. In addition to this, in certain contexts the metatheorems make it possible to generalize proofs by eliminating strong existence assumptions made in the results to be proved which might not be satisfied in general and even where they are often require complicated functional analytic proofs (sometimes involving ultrapowers). In particular, we will show the soundness of a general principle for such generalizations for a large class of statements. The classes of structures covered include metric, hyperbolic (in the sense of Kirk and Reich), δ-hyperbolic (in the sense of Gromov), CAT(0), normed, uniformly convex spaces as well as $\mathbb{R}$-trees (in the sense of Tits). The extraction method uses functional interpretation based on a novel concept of majorizability relative to suitably chosen reference points in the spaces at hand. During the last couple of years this approach has led to many new results in nonlinear analysis and geodesic geometry and also appears to be promising in other areas such as ergodic theory or geometric group theory.

In this talk we will give a general survey of some of these developments. (Received September 18, 2006)