Regular sequences of quasi-nonexpansive operators and their applications

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Abstract

We present a systematic study of regular sequences of quasi-nonexpansive operators in Hilbert space. We are interested, in particular, in weakly, boundedly and linearly regular sequences of operators. We show that the type of the regularity is preserved under relaxations, convex combinations and products of operators. Moreover, in this connection, we show that weak, bounded and linear regularity lead to weak, strong and linear convergence, respectively, of various iterative methods. This applies, in particular, to block iterative and string averaging projection methods, which, in principle, are based on the above-mentioned algebraic operations applied to projections. Finally, we show an application of regular sequences of operators to variational inequality problems.