

# A combined relaxation method for nonlinear variational inequalities

Konnov I.

*Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia*

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## Abstract

When applied to variational inequalities, combined relaxation (CR) methods are convergent under mild assumptions. Namely, the underlying mapping need not be strictly monotone. In this paper, we describe a class of CR methods for nonlinear variational inequality problems (NVI), which involve two, rather than one, nonlinear mappings and a nonsmooth convex function. We establish a convergence result for the CR method in the monotone case and also show that it attains a linear rate of convergence under the additional strong monotonicity assumption. Implementation issues are also discussed.

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## Keywords

Combined relaxation method, Linear convergence, Monotone nonlinear variational inequalities, Non-smooth convex function