

# PRECONDITIONING FOR BOUND CONSTRAINED QUADRATIC PROGRAMMING PROBLEMS ARISING FROM DISCRETIZATION OF VARIATIONAL INEQUALITIES

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## Abstract

The active set based MPRGP (modified proportioning with reduced gradient projection) [1] for the solution of partially bound constrained quadratic programming problems turned out to be an important ingredient in development of scalable algorithms for the solution of variational inequalities by FETI [3] and BETI [4] domain decomposition methods. The algorithm was proved to have R-linear rate of convergence in terms of the spectral condition number of the Hessian matrix. Our poster considers the preconditioning of MPRGP active set based algorithm [1] with goal to get improved rate of convergence of the algorithm. We are interested in results which concern the overall rate of convergence, which requires not only the preconditioning of the solution of auxiliary linear solvers, but also the preconditioning of nonlinear steps. We first report improved bounds on the rate of convergence of MPRGP with preconditioning by conjugate projector applied to a model boundary variational inequality [2] and give results of numerical experiments that are in agreement with the theory. The method uses, similarly as related multigrid algorithms, the auxiliary subspace which is not effected by the constraints. Then we give numerical examples which indicate the ways how to overcome this limitation in the framework of FETI based domain decomposition methods.

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## References

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