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**CUBIC REGULARIZATION OF NEWTON'S METHOD  
FOR CONVEX PROBLEMS WITH CONSTRAINTS**

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**Abstract**

In this paper we derive efficiency estimates of the regularized Newton's method as applied to constrained convex minimization problems and to variational inequalities. We study a one-step Newton's method and its multistep accelerated version, which converges on smooth convex problems as  $O(\frac{1}{k^3})$ , where  $k$  is the iteration counter. We derive also the efficiency estimate of a second-order scheme for smooth variational inequalities. Its global rate of convergence is established on the level  $O(\frac{1}{k})$ .

**Keywords:** convex optimization, variational inequalities, Newton's method, cubic regularization, worst-case complexity, global complexity bounds.

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