

# GRADIENT METHODS FOR CONVEX OPTIMIZATION IN RELATIVE SCALE

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In this talk we discuss new efficient gradient schemes, which can solve a structural convex optimization problem with certain *relative* accuracy  $\delta$ . As an example, we consider two non-trivial classes of linear programming problems, which can be solved in  $O(\frac{\sqrt{n \ln m}}{\delta} \ln n)$  iterations of a gradient-type method ( $n$  and  $m$ ,  $n < m$ , are the sizes of the corresponding problems). The proposed schemes are based on preliminary computation of an ellipsoidal rounding for some polytopes in  $R^n$ . In both cases this computation can be performed very efficiently, in  $O(n^2 m \ln m)$  operations at most.