

Towards a proximal bundle method for minimizing lower-C2 functions

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**Abstract.** The proximal point mapping is the basis of many optimization techniques for convex functions. By means of variational analysis, the concept of proximal mapping was recently extended to nonconvex functions that are prox-regular and prox-bounded. In such a setting, the proximal mapping is locally Lipschitz continuous and its set of fixed points coincide with the critical points of the original function. This suggests that the many uses of proximal points, and their corresponding proximal envelopes (Moreau envelopes), will have a natural extension from Convex Optimization to Nonconvex Optimization. For example, bundle proximal point methods for convex optimization might be redesigned to work for nonconvex functions. In order to begin the practical implementation of proximal points in a nonconvex setting, a first crucial step would be to design efficient methods of approximating nonconvex proximal points. This would provide a solid foundation on which future design and analysis for nonconvex proximal point methods could flourish. We present a methodology based on the computation of proximal points of piecewise affine models of the nonconvex function. These models can be built with only the knowledge obtained from a black box providing, for each point, the function value and one subgradient.