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A Strong Proximal Average

Recently, researchers have examine the question of how to smoothly transform one function into another. This is, given functions f_0 and f_1, how can we build a "well-behaved" parameterized function $F(x, p)$ such that $F(x, 0) = f_0(x)$ and $F(x, 1) = f_1(x)$? For convex functions the idea of a "proximal average" has been shown to be highly effective. We explore the proximal average, provide some previous results regarding convex functions, and develop a method to extend these results to non-convex functions. In doing so we develop a new version of the proximal average, which is more complicated but provides stronger stability results.