

ANIMATION: PROXIMAL BUNDLE METHOD

Wellington de Oliveira

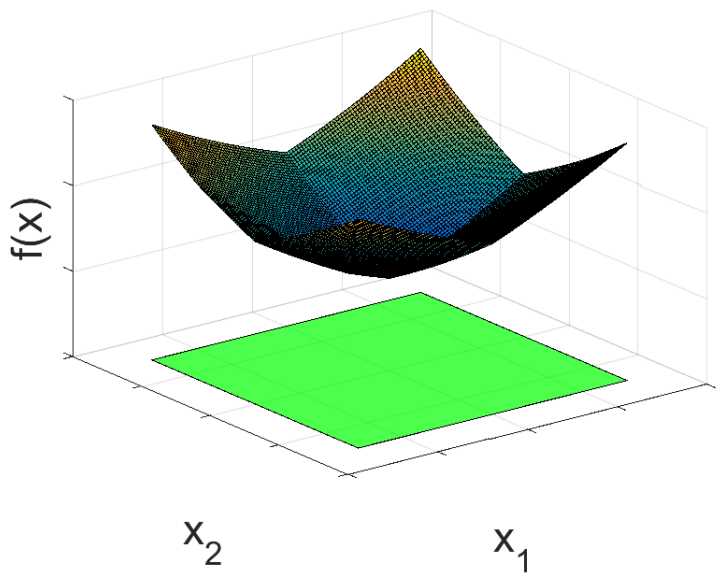
MINES ParisTech, PSL-Research University

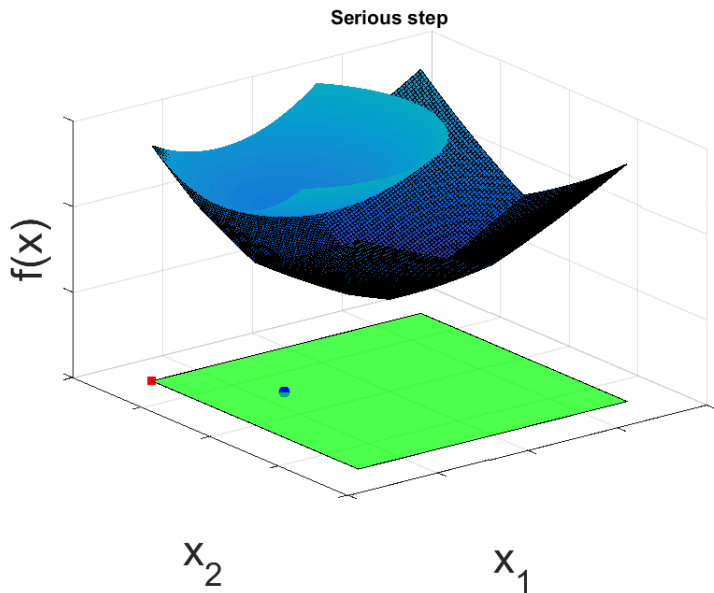
CMA - Centre de Mathématiques Appliquées

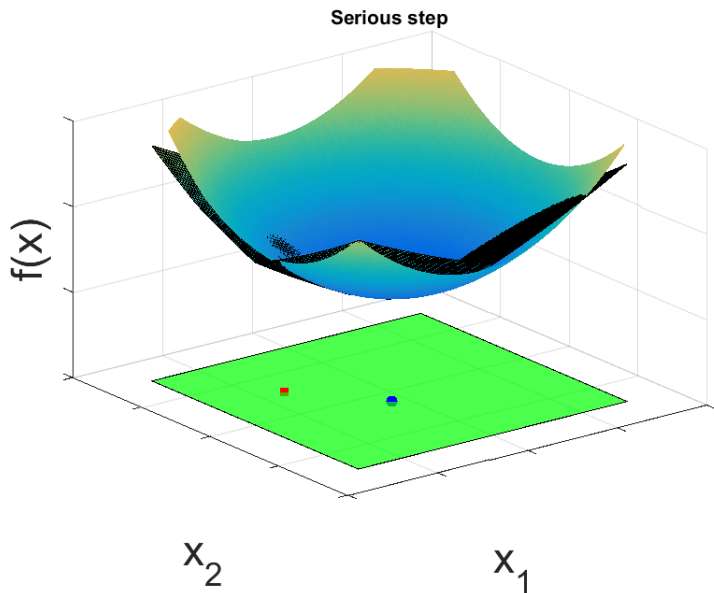
6 de outubro de 2018

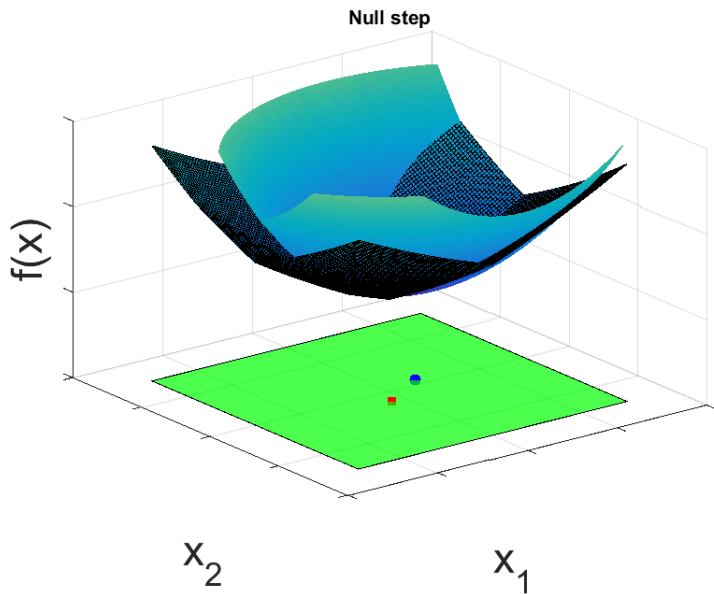
PROXIMAL BUNDLE METHOD: PBM

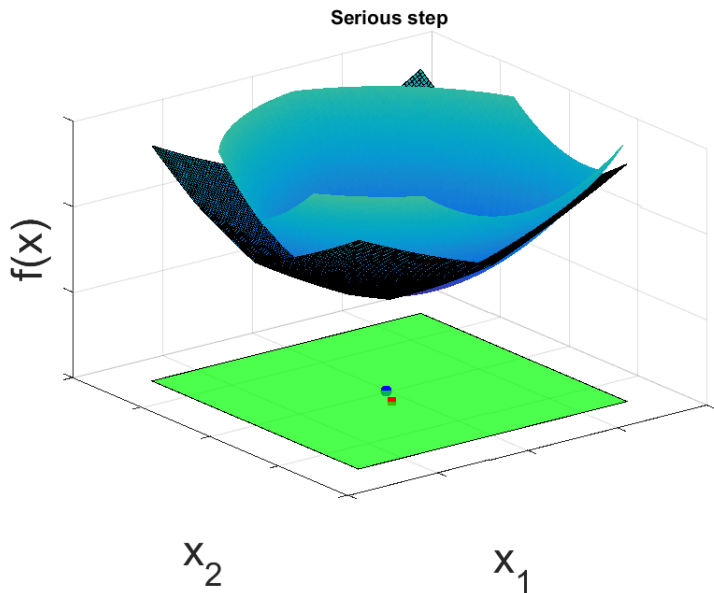
- ▶ The problem: $\min_{x \in X} f(x)$
- ▶ Both function f and feasible set X are convex
- ▶ Oracle: given x^k , an oracle provides us with $f(x^k)$ and $g^k \in \partial f(x^k)$
- ▶ Cutting-plane model $\check{f}^k(x) := \max_{j \in J_k} \{f(x^j) + \langle g^j, x - x^j \rangle\}$
- ▶ Trial point: $x^{k+1} := \arg \min_{x \in X} \check{f}^k(x) + \frac{1}{2t} \|x - \hat{x}^k\|^2$
- ▶ Serious step: if $f(x^{k+1}) \leq f(\hat{x}^k) - \kappa(f(\hat{x}^k) - \check{f}^k(x^{k+1}))$ then $\hat{x}^{k+1} \leftarrow x^{k+1}$
- ▶ Null step: if $f(x^{k+1}) > f(\hat{x}^k) - \kappa(f(\hat{x}^k) - \check{f}^k(x^{k+1}))$ then $\hat{x}^{k+1} \leftarrow \hat{x}^k$

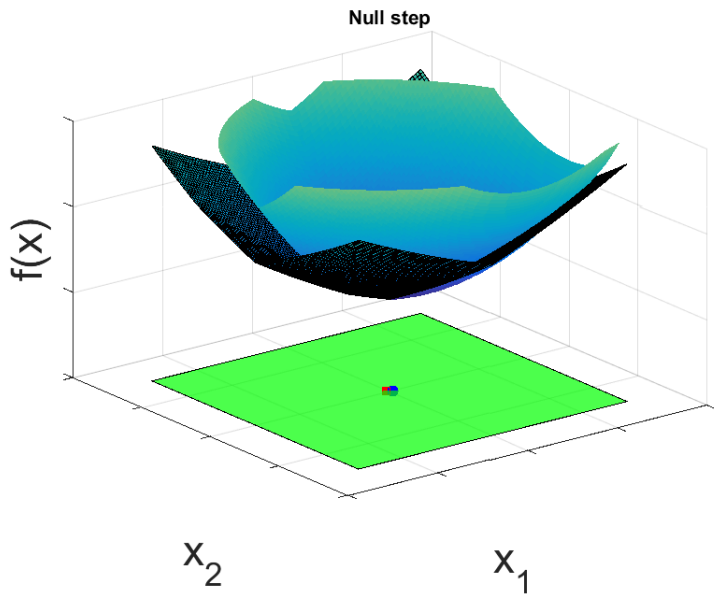


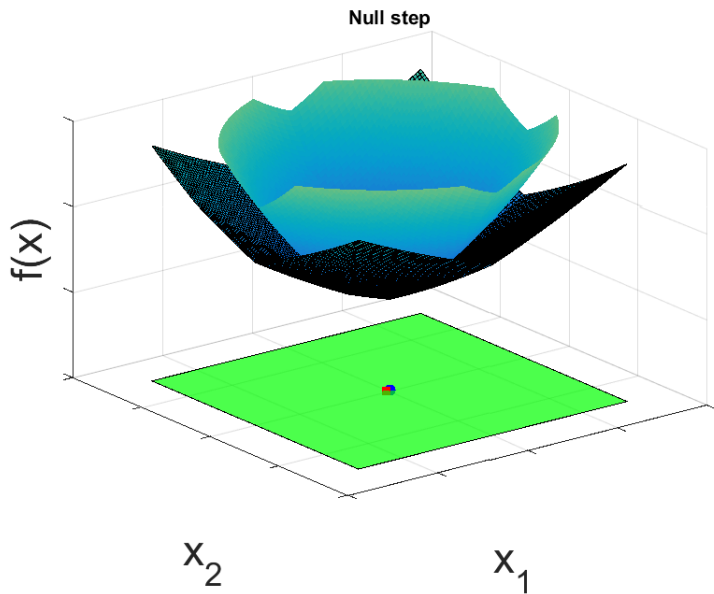




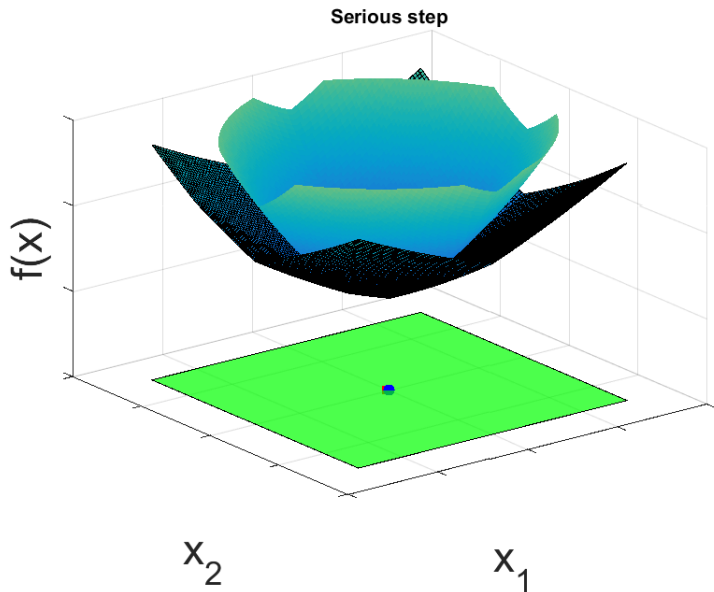




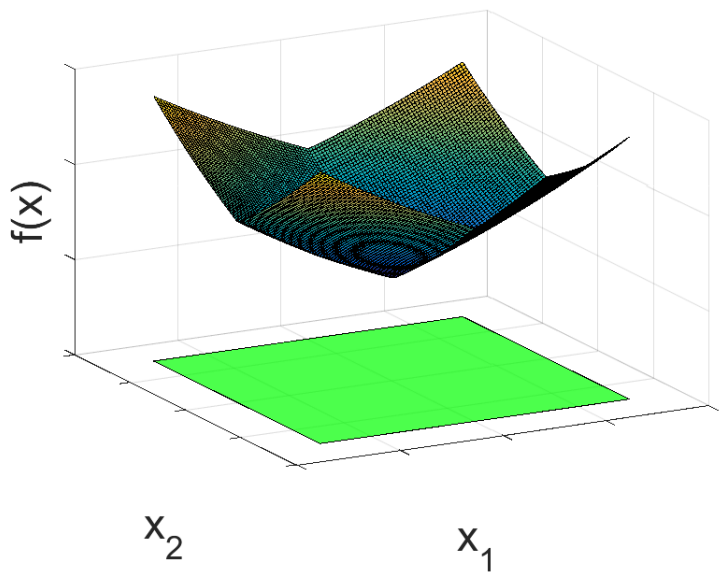




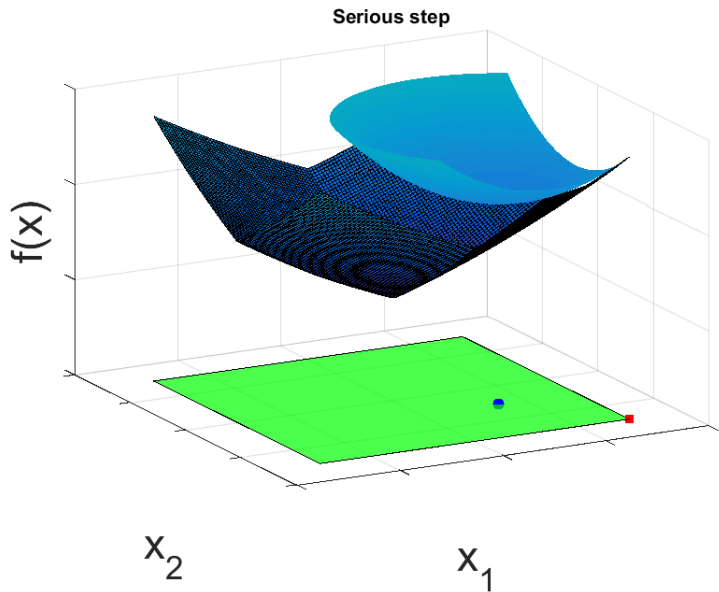
PBM: OPTIMAL SOLUTION



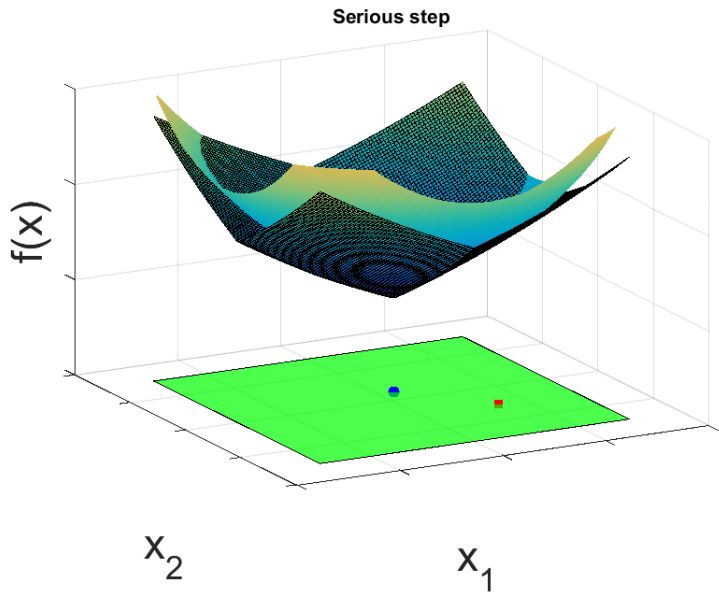
ANOTHER PERSPECTIVE



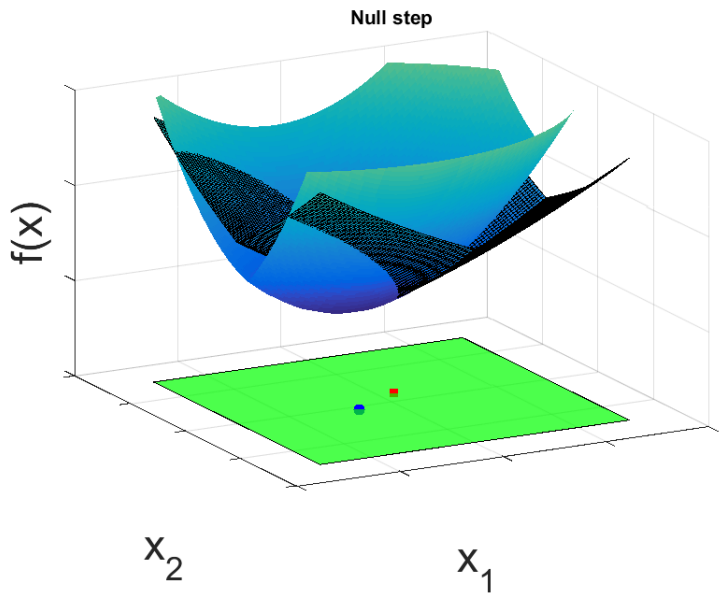
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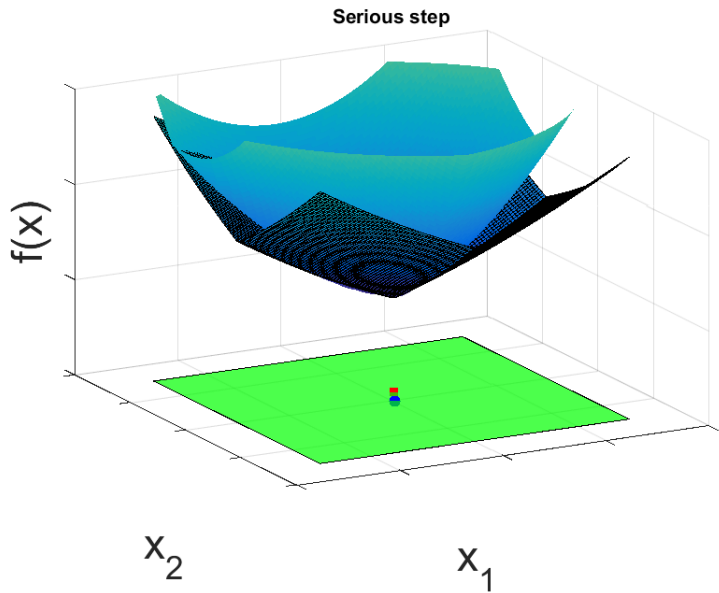
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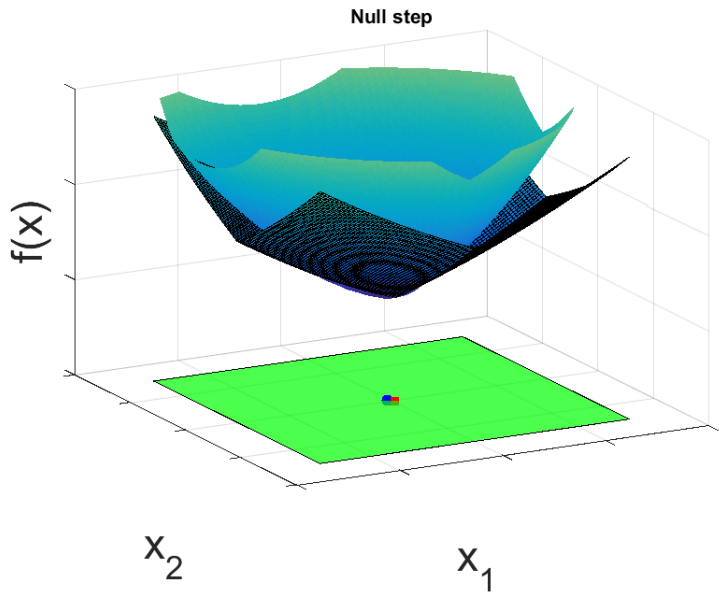
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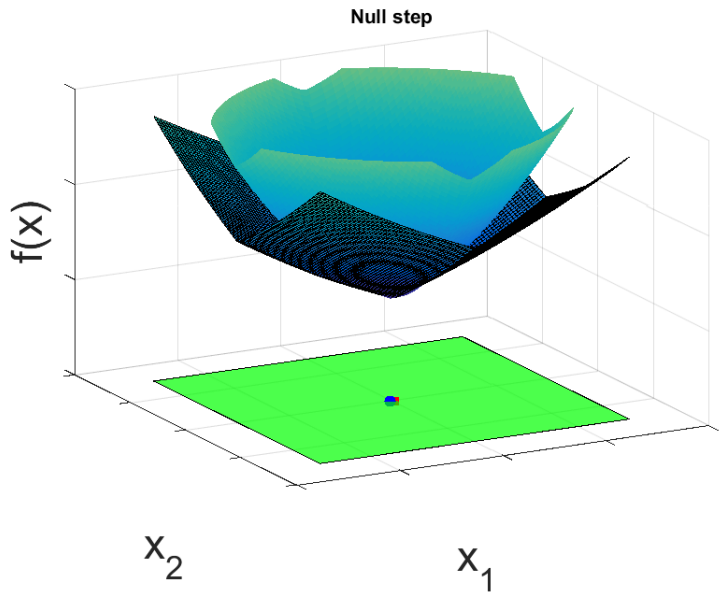
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ANOTHER PERSPECTIVE: OPTIMAL SOLUTION

