[redacted]

Two Approaches

Optimization:

29

- Smooth, convex-concave

- SP-Mirror Prox Requires:
  - projections on
  - projections on

- Convergence:

$O\left(\frac{1}{t}\right)$

$$O\left(\frac{1}{\sqrt{t}}\right)$$

$$\Pi(a, b)$$

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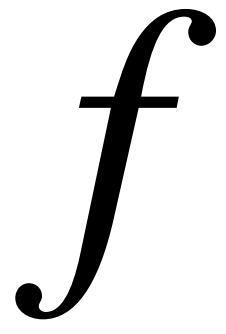

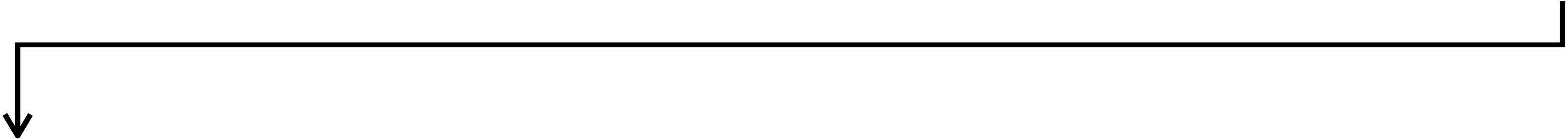

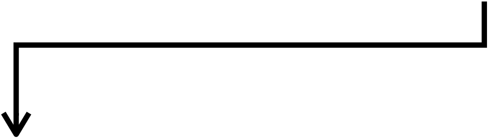

- Non-smooth, convex

- Mirror Descent requires:
  - projections on
  - subgradients of

- Convergence:

$$\min_{\Gamma \in \Pi(\mathbf{a},\mathbf{b})} f(\Gamma) \equiv \min_{\Gamma \in \Pi(\mathbf{a},\mathbf{b})} \max_{\kappa \in \mathscr{B}_F} \langle \Gamma, \kappa \rangle$$

Sinkhorn-Knopp Algo.

Edmonds Algo.

We give $O(n \log n)$ algorithm for our decomposable functions

Optimization:
Two Approaches

$$\min_{\Gamma \in \Pi(\mathbf{a},\mathbf{b})} f(\Gamma) \equiv \min_{\Gamma \in \Pi(\mathbf{a},\mathbf{b})} \max_{\kappa \in \mathscr{B}_F} \langle \Gamma, \kappa \rangle$$

- Non-smooth, convex
- Mirror Descent requires:
  - **projections** on $\Pi(\mathbf{a}, \mathbf{b})$ — Sinkhorn-Knopp Algo.
  - **subgradients** of f — Edmonds Algo.
- Convergence: $O(\frac{1}{\sqrt{t}})$

- **Smooth**, convex-concave
- SP-Mirror Prox Requires:
  - **projections** on $\Pi(\mathbf{a}, \mathbf{b})$
  - **projections** on $\mathscr{B}_F$ — We give $O(n \log n)$ algorithm for our decomposable functions
- Convergence: $O(\frac{1}{t})$

Structured OT
Application: Domain Adaptation