Dimension-reduced Interior Point Method

Discussion 8

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Potential reduction

- Working on C transformation
- The warm-start Lanczos improves by 20% in speed

The solver is designed for solving general problem

$$\begin{aligned} \min_{\mathbf{x}} \quad & f(\mathbf{x}) \\ \text{subject to} \quad & \mathbf{A}\mathbf{x} = \mathbf{b} \\ & \mathbf{x} \geq \mathbf{0} \end{aligned}$$

with smooth convex $f(\mathbf{x})$ via potential reduction

$$\phi(\mathbf{x}) \;:=\; \rho \log(f(\mathbf{x}) - z) + \sum_{i=1}^{n} x_i$$

- A general framework exploiting curvature in potential reduction
- HSD embedding stands for $\mathbf{A} = \mathbf{e}^\top, \mathbf{b} = 1$ and $f(\mathbf{x}) = \frac{1}{2}\|\hat{\mathbf{A}}\mathbf{x}\|^2$

HDSDP

Getting the solver into COPT