Summary

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1 strategies

- Bending Line search:

  Use Armijo line search to determine the step size, if $x_i + \alpha_i p_i$ infeasible, set $\alpha_i = 0$

- Modified Coarse Grid Constraint:

  Modify coarse grid bounds as $\tilde{l_H} \leq x_H \leq \tilde{u_H}$ such that $l_h \leq v_h + I_H^h(e_2 - v_H) \leq u_h$

- Rescaled transform operator:

  In 2D case, Let $A = \begin{bmatrix} \dots & \frac{1}{4} & \frac{1}{2} & \frac{1}{4} & \dots \\ \frac{1}{2} & 1 & \frac{1}{2} & \dots \\ \frac{1}{4} & \frac{1}{2} & \frac{1}{4} & \dots \end{bmatrix}$ traditional update and downdate is: $I_H^h = A^T$; $I_h^H = \frac{1}{4}A$, rescaled is: $I_H^h = 2A^T$; $I_h^H = \frac{1}{8}A$.

2 Application

	Bending Line Search	Modified Constraint	Rescaled Operator
1D Laplacian	✖	✔	✖
Advection	✖	✔	✖
Linear/Bilinear Control	✖	✖	✔