OPTIMIZATION FOR MULTI-OBJECTIVE ENVIRONMENTAL POLICYMAKING

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OTHER INFORMATION

CATEGORIZED AS

» **Environment**
» Other
» Remediation
» Sensing
» **Engineering**
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» **Research Tools**
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PATENT STATUS

Patent Pending

BRIEF DESCRIPTION

Traditional environmental policymaking often struggles to efficiently target interventions to achieve multiple, complex air quality goals simultaneously across a geographic area. This innovation, developed by UC Berkeley researchers, addresses this challenge by providing a sophisticated, multi-objective optimization method for targeted reduction of air pollution. The method generates a comprehensive mitigation pathway by integrating several modules: a forward module to model pollutant concentrations, a target concentration surface that defines the policy goals, a prioritization module to assess uncertainty and importance via a prioritization covariance matrix, and a Bayesian inversion module to estimate optimum emissions required to meet the target. This systematic, data-driven approach culminates in a mitigation pathway that guides the performance of specific pollution control measures, offering a significant advantage over conventional, less targeted policy-making by ensuring resources are directed where they will have the maximum environmental impact.

SUGGESTED USES

- To design targeted and efficient environmental policies for reducing multiple air pollutants in specific geographic regions.
- To provide optimum emissions estimates required to meet predefined air quality standards.
- To generate actionable mitigation pathways for pollution control measures (e.g., regulating specific sources).
- To optimize resource allocation for environmental cleanup and policy implementation.

ADVANTAGES

- Provides an optimized, multi-objective solution for complex environmental policymaking.
- Integrates forward modeling (concentration prediction) with Bayesian inversion (emissions estimation) for robust results.
- Generates a mitigation pathway that translates data into concrete, actionable pollution control measures.
- Accounts for uncertainty and prioritization through the use of a covariance matrix.
- Enables the targeted reduction of one or more specific pollutants.

RELATED MATERIALS

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