Bilevel problems under the Bayesian approach: Existence of solutions and some computational aspects

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Abstract

In 1996, Mallozzi and Morgan proposed a new model for Stackelberg games which we refer to as the Bayesian approach. In the model, the leader has only partial information about how followers select their reaction among possibly multiple optimal ones. This partial information is modeled as a decision-dependent distribution, the so-called belief of the leader. In this work, we formalize the setting of this approach for bilevel games admitting multiple leaders and we provide new results on existence of solutions. We pay particular attention to the fundamental case of linear bilevel problems and to two classes of beliefs, namely absolutely continuous beliefs, and vertex-supported beliefs. Finally, we provide some numerical experiments.

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