Review 1

PC member: Mohammed El-Houcine Ayoubi
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Review

The paper presents a promising and well-motivated extension of optimal importance sampling (IS) to a bi-level stochastic optimization (SO) setting involving implicit fixed-point structures, addressing a problem that is both relevant and technically challenging.

One of the strongest aspects of the work is its clear theoretical motivation: adapting optimal IS to settings where gradients are defined only implicitly. The problem formulation is interesting because fixed-point-dependent gradients are not widely explored in the IS literature, making the research topic relevant. The author is also using recent state-of-the-art results. Additionally, the paper clearly identifies the central difficulty: the dependence of each sample's gradient on an implicit equation, which highlights the originality of the proposed approach.

That said, the paper would benefit from more concrete examples of learning problems that naturally give rise to these fixed-point equations, especially scenarios where classical stochastic optimization methods fail or become inefficient. Including such motivating examples would strengthen the motivation behind this work and make the practical relevance clearer in current problems that arise from using traditional stochastic optimization techniques.

Overall, the extended abstract is clear and provides interesting intuition, explicitly identifying the theoretical challenges introduced by implicit fixed-point gradients and providing more context behind the algorithmic choices.

Reviewer's confidence

2: Partly; I may be missing some concepts or elements of the state of the art, but I got the main idea.

Usage of LLM

1: No, not at all.

Confidential remarks for the program committee

(None provided)