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# Adaptive Importance Sampling meets Mirror Descent: a Bias-variance tradeoff

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## Résumé

Abstract : Adaptive importance sampling is a widely spread Monte Carlo technique that uses a re-weighting strategy to iteratively estimate the so-called target distribution. A major drawback of adaptive importance sampling is the large variance of the weights which is known to badly impact the accuracy of the estimates. This paper investigates a regularization strategy whose basic principle is to raise the importance weights at a certain power. This regularization parameter, that might evolve between zero and one during the algorithm, is shown (i) to balance between the bias and the variance and (ii) to be connected to the mirror descent framework. Using a kernel density estimate to build the sampling policy, the uniform convergence is established under mild conditions. Finally, several practical ways to choose the regularization parameter are discussed and the benefits of the proposed approach are illustrated empirically.

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