Evaluation
Online learning
links with optimization and games
Université Paris–Saclay

hyperbolic entropy

Let $d \geqslant 1$. The paper[1] [GHS20] studies an algorithm based on the hyperbolic entropy:

$$\mathrm{H}_\beta(x) = \sum_{i=1}^{d} \left(x_i \operatorname{arcsinh}\left(\frac{x_i}{\beta}\right) - \sqrt{x_i^2 + \beta^2} \right), \quad x \in \mathbb{R}^d.$$

1) Rewrite the algorithm and the proofs of the regret bounds using the notation and tools from the course.

2) Generalize the algorithm and regret bounds from the paper using the theory from the course.

References

[GHS20] Udaya Ghai, Elad Hazan, and Yoram Singer. Exponentiated gradient meets gradient descent. In *Algorithmic learning theory*, pages 386–407. PMLR, 2020.

[1] the paper is available at https://proceedings.mlr.press/v117/ghai20a/ghai20a.pdf