

Advanced Algorithms – Handout 10

Robert Krauthgamer

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1 Today's topics

- Online prediction via Multiplicative Weights (MW) update rule
- Solving LPs approximately using MW algorithm

2 Homework

1. Prove that every online prediction algorithm, even with only two possible outcomes and experts, must have $\Omega(\sqrt{T})$ regret (i.e. difference from best expert in hindsight).

Hint: Use the following fact. Let X be a random variable with binomial distribution $B(n, 1/2)$ (i.e. X is the number of heads in n independent flips of a fair coin). Then for all $0 < c < 1$ we have $\Pr[X - n/2 \geq c\sqrt{n}] \geq \Omega(c)$.