

$$\text{Let } \eta = \sqrt{\frac{B^2}{\rho^2 T}} = \frac{B}{\rho \sqrt{T}}$$

$$\leq \frac{e \sqrt{T}}{2 B T} B^2 + \frac{B}{2 T e \sqrt{T}} T e^2$$

$$\frac{e B}{2 \sqrt{T}} + \frac{e B}{2 \sqrt{T}} = \frac{e B}{\sqrt{T}}$$

$$f(\bar{x}) - f(x^*) \leq \frac{e B}{\sqrt{T}}$$