Lecture Notes for Sep 16, 2025

Overshooting (loose bound)

Basis

$$T(n) = 2T(\frac{n}{2}) + 2$$

$$T(n) = O(n^2)$$

$$T(n) \leq cn^2$$

Inductive Hypothesis

It holds for $k < n$, specifically $k = \frac{n}{2}$.

$$T(\frac{n}{2}) \leq c(\frac{n}{2})^2$$

Substitution

$$T(n) = 2T(\frac{n}{2})$$

$$T(n) \leq 2c(\frac{n}{2})^2 + n$$

Undershooting

Run extended form of guess