Exponential Decay Learning Rate Scheduling

Gradual Continuous Reduction

📉 Core Concept

Gradually decrease learning rate
following an exponential function

Formula

$$LR = initial\_lr \times decay\_rate^{(epoch\ /\ decay\_steps)}$$

Decay Rate: Typically 0.94-0.99
(per epoch or step)

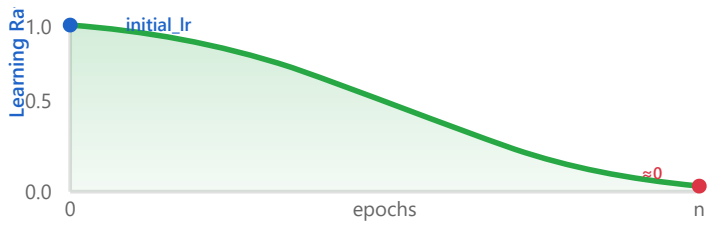
vs Step Decay

Step Decay	Exponential
Sudden changes	Smooth transition
Staircase reduction	Continuous reduction

⚖️ Characteristics

- ✓ Smoother than step decay
- ✓ Smooth transition without sudden changes
- ✓ Effective for long training runs
- ⚠ Can be too aggressive if decay rate poorly tuned

Decay Curve Visualization



🎯 Commonly Used In

- Reinforcement Learning
- NLP