



deeplearning.ai

Optimization

Algorithms

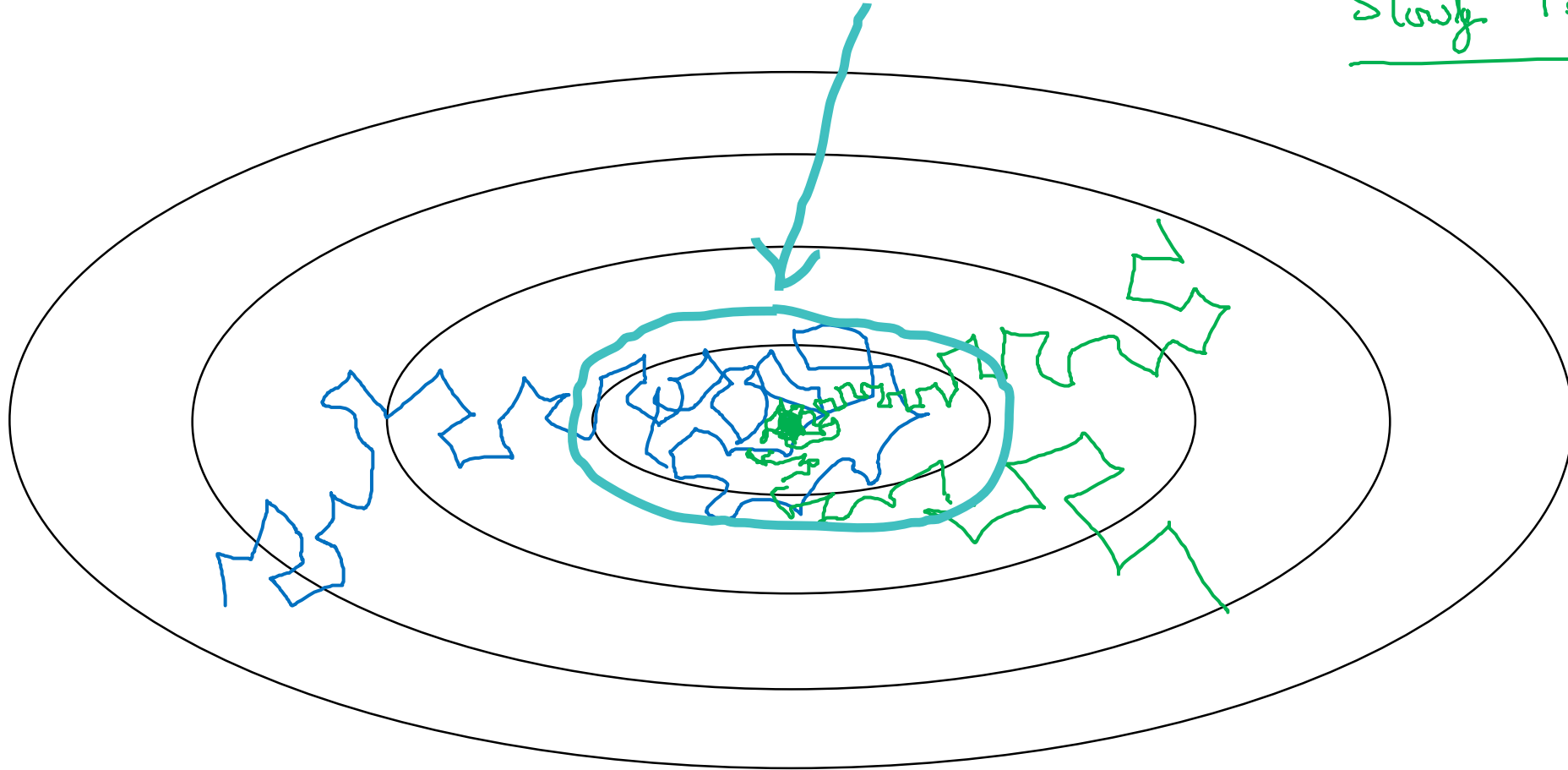
Learning rate

decay

Learning rate decay

Decreasing the learning rate
when approaching here

Slowly reduce α



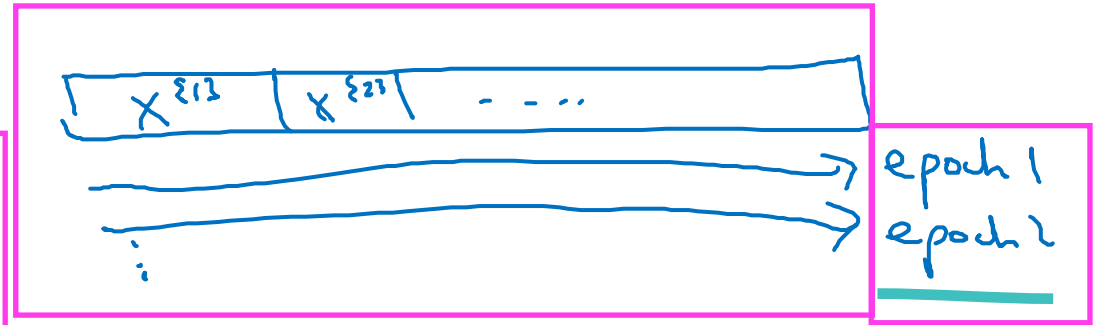
Slowly reducing the learning rate when approaching the minimum value.

Learning rate decay

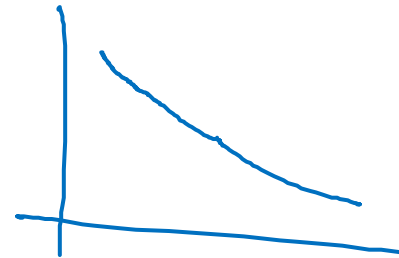
1 epoch = 1 pass through data.

$$\alpha = \frac{1}{1 + \text{decay-rate} * \text{epoch-num}} \alpha_0$$

Epoch	α
1	0.1
2	0.67
3	0.5
4	0.4
\vdots	\vdots



$$\alpha_0 = 0.2$$
$$\text{decay-rate} = 1$$



Other learning rate decay methods

formula

$$\alpha = 0.95^{\text{epoch-num}} \cdot \alpha_0 \quad - \text{exponentially decay.}$$

$$\alpha = \frac{k}{\sqrt{\text{epoch-num}}} \cdot \alpha_0 \quad \text{or} \quad \frac{k}{\sqrt{t}} \cdot \alpha_0$$



discrete staircase
(Discrete Staircase)

Manual decay. (Manual Decay)