

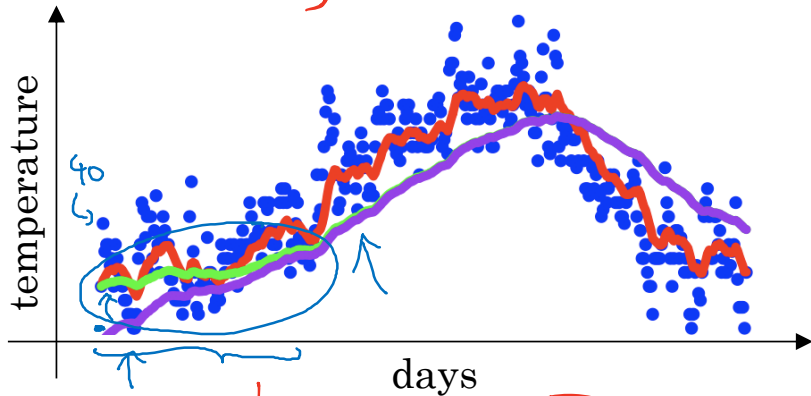


deeplearning.ai

Optimization Algorithms

Bias correction
in exponentially
weighted average

Bias correction (during the initial phase)



$$\beta = 0.98$$

purple curve
without bias
Correction

$$\rightarrow v_t = \beta v_{t-1} + (1 - \beta)\theta_t$$

$$v_0 = 0$$

$$v_1 = \cancel{0.98 v_0} + 0.02 \theta_1$$

$$v_2 = 0.98 v_1 + 0.02 \theta_2$$

$$= 0.98 \times 0.02 \times \theta_1 + 0.02 \theta_2$$

$$= \underline{0.0196} \theta_1 + \underline{0.02} \theta_2$$

$$\frac{v_t}{1 - \beta^t}$$

$$t=2: 1 - \beta^t = 1 - (0.98)^2 = 0.0396$$

$$\frac{v_2}{0.0396} = \frac{0.0196 \theta_1 + 0.02 \theta_2}{0.0396}$$