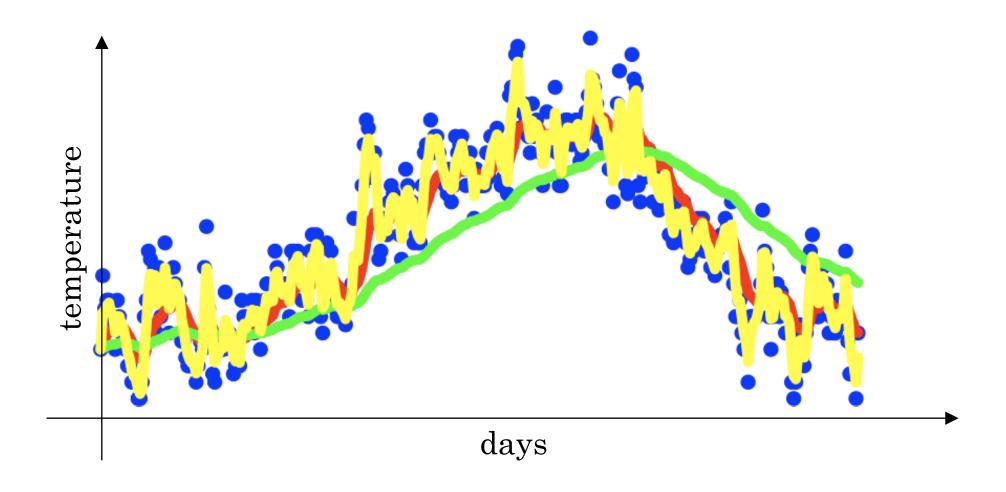


Optimization Algorithms

Understanding exponentially weighted averages

Exponentially weighted averages

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



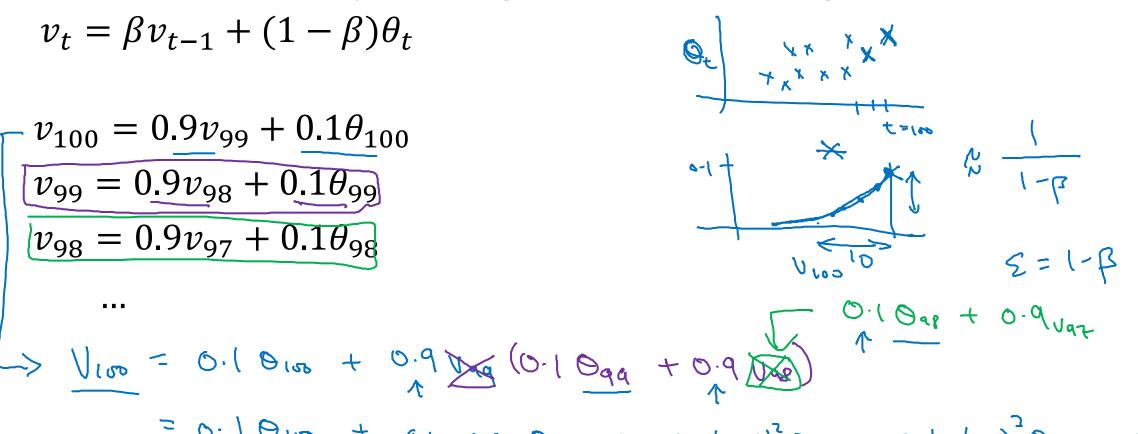
Exponentially weighted averages

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

$$v_{100} = 0.9v_{99} + 0.1\theta_{100}$$

$$v_{99} = 0.9v_{98} + 0.1\theta_{99}$$

$$v_{98} = 0.9v_{97} + 0.1\theta_{98}$$



$$\frac{100}{100} = \frac{1}{100} = \frac{$$

Implementing exponentially weighted averages

$$v_0 = 0$$

 $v_1 = \beta v_0 + (1 - \beta) \theta_1$
 $v_2 = \beta v_1 + (1 - \beta) \theta_2$
 $v_3 = \beta v_2 + (1 - \beta) \theta_3$

$$V_{0} := 0$$
 $V_{0} := \beta V + (1-\beta) O_{1}$
 $V_{0} := \beta V + (1-\beta) O_{2}$
 $V_{0} := \beta V + (1-\beta) O_{2}$