

2.

3.15

Intervals between rewards are important

$$V_{\pi}(s) = E_{\pi} \left[\sum_{k=0}^{\infty} \gamma^k R_{t+k+1} \mid S_t = s \right]$$

adding $+c$ to all rewards

$$E_{\pi} \left[\sum_{k=0}^{\infty} \gamma^k (R_{t+k+1} + c) \mid S_t = s \right]$$

$$= E_{\pi} \left[\sum_{k=0}^{\infty} \gamma^k R_{t+k+1} + \gamma^k c \mid S_t = s \right]$$

$$= E_{\pi} \left[\sum_{k=0}^{\infty} \gamma^k R_{t+k+1} \mid S_t = s \right] + c E_{\pi} \left[\sum_{k=0}^{\infty} \gamma^k \mid S_t = s \right]$$

$$V_{\pi}(s) + c \cdot \frac{1}{1-\gamma}$$

adds a constant of $\boxed{V_c = \frac{c}{1-\gamma}}$ to all

values for every state thereby does not affect relative values of states