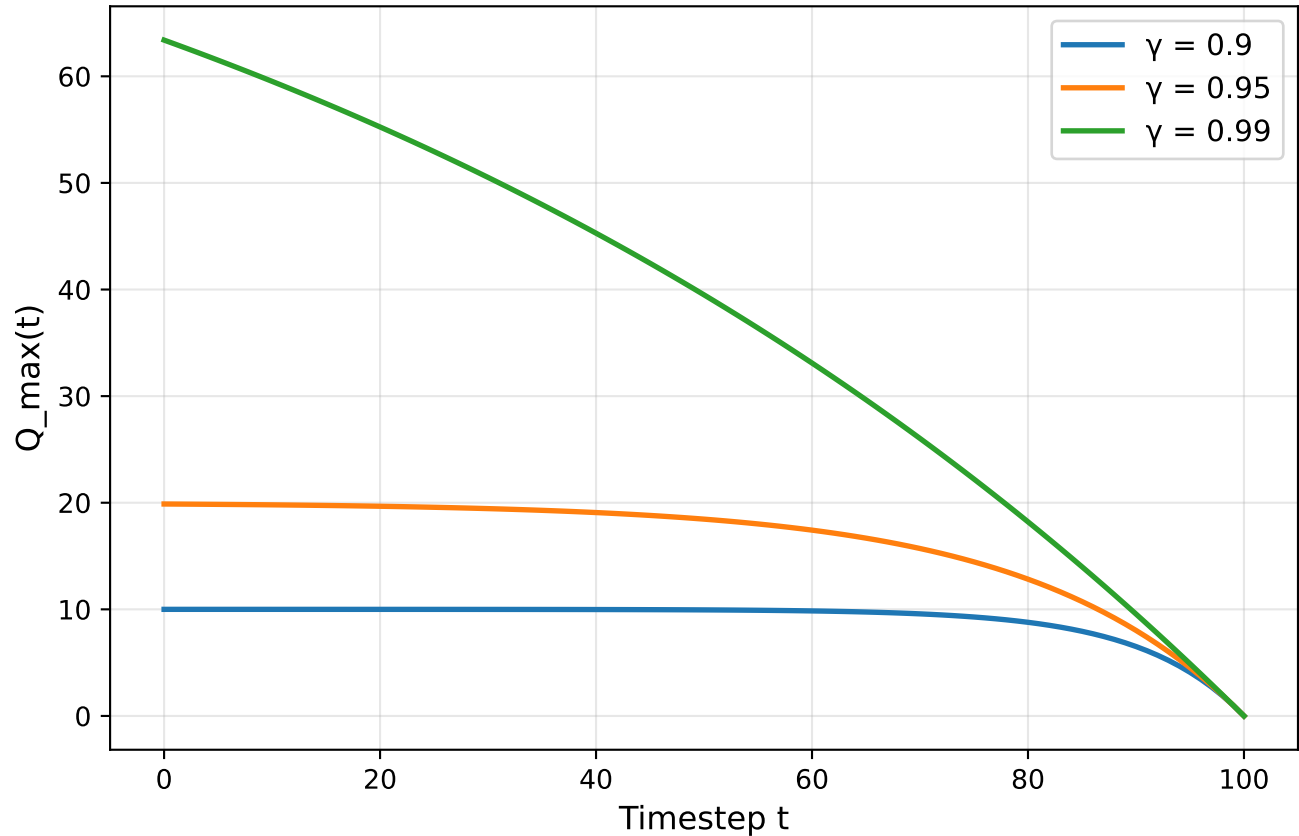
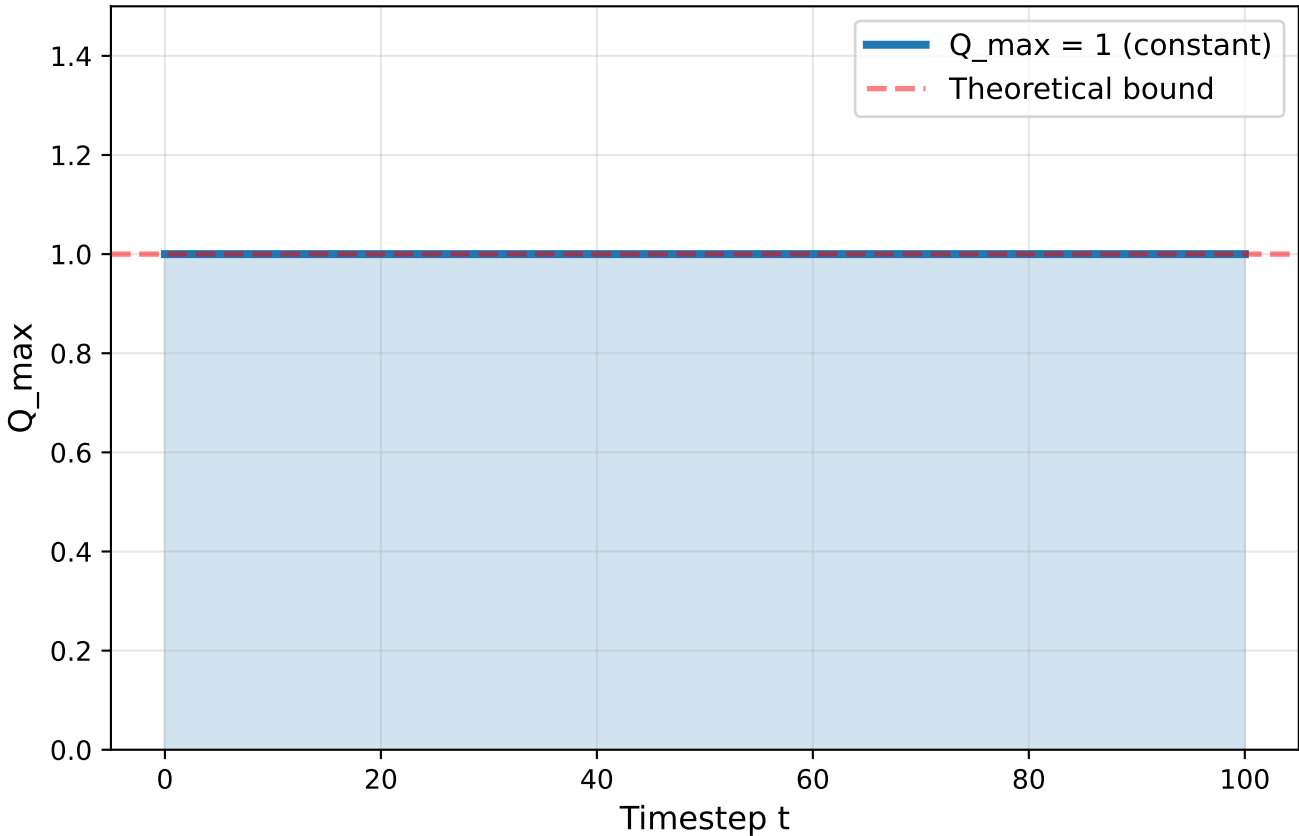


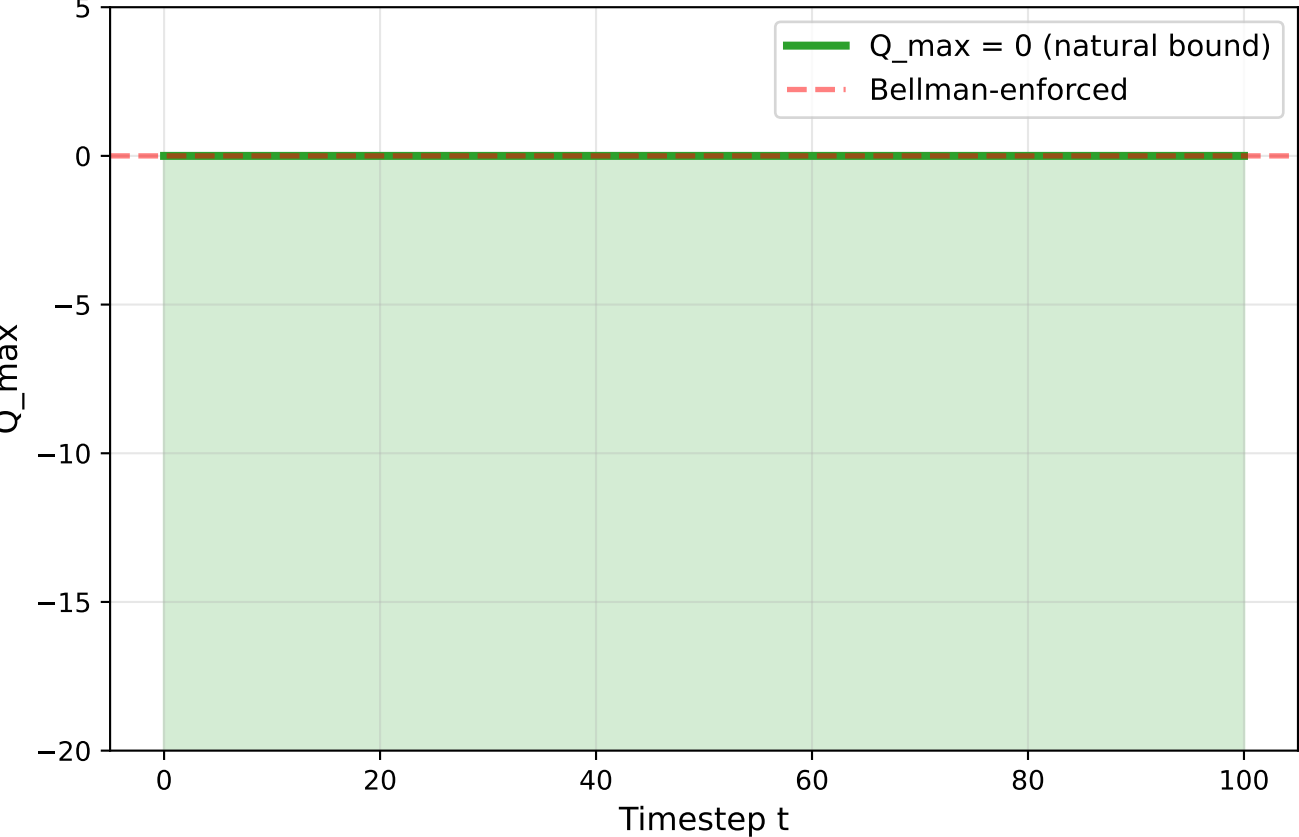
**Dense Positive:  $Q_{\max}(t) = (1-\gamma^{(H-t)})/(1-\gamma)$**   
**Decreases with time (remaining potential)**



**Sparse Terminal:  $Q_{\max} = 1$  (constant)**  
**No time dependence**



**Dense Negative:  $Q_{\max} = 0$  (constant)**  
**Naturally satisfied by Bellman equation**



**Summary: Reward Structure Determines QBound Effectiveness**

Reward Type	Q_max Behavior	Overestimation Risk	QBound Helps?
Sparse Terminal	Constant (1.0)	Low (20%)	No (~0%)
Dense Positive	Decreases over time	HIGH (85%)	YES (+12-34%)
Dense Negative	Constant (0.0)	Minimal (5%)	NO (-3 to -47%)