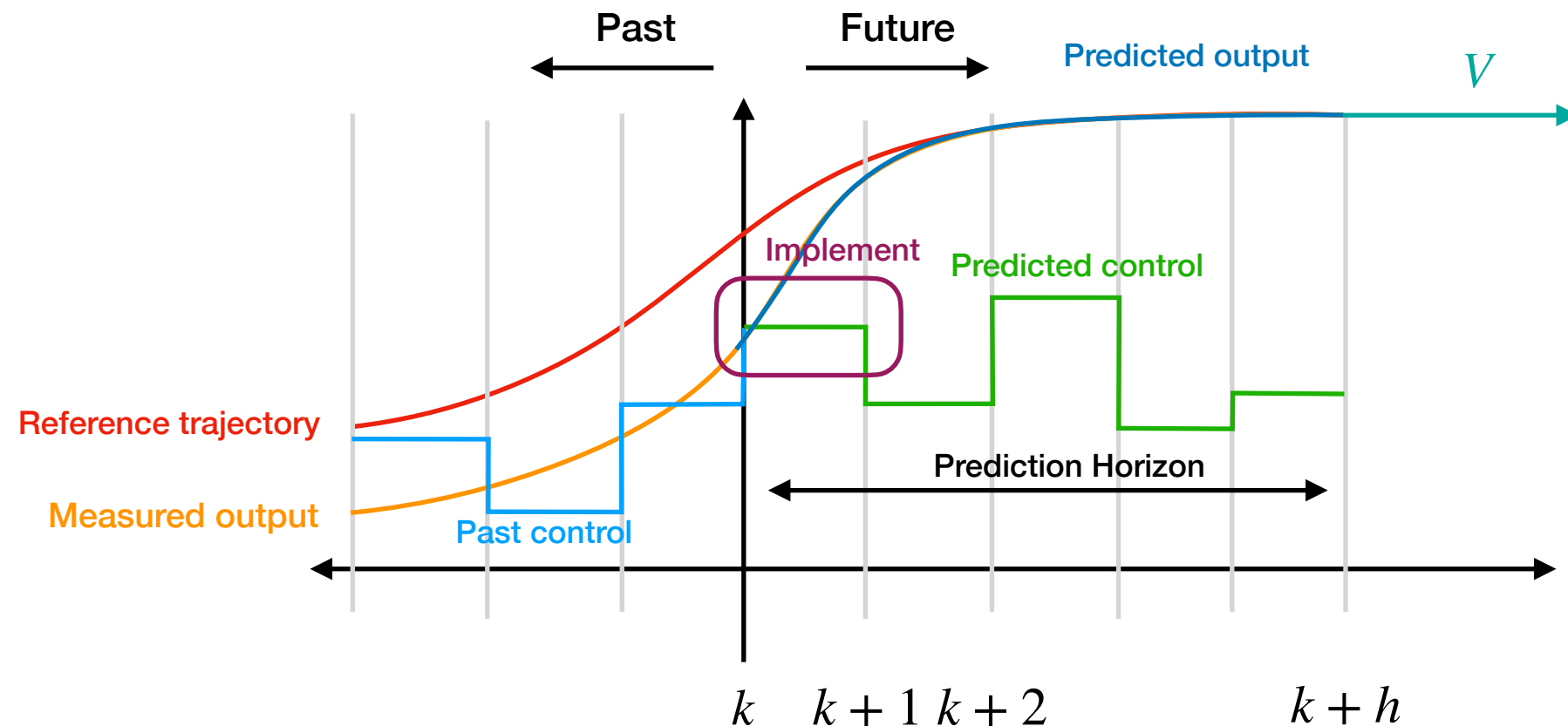


# MPC Idea



Want to solve infinite optimization problem:

$$\text{maximise}_{\pi_t} \lim_{T \rightarrow \infty} \mathbb{E}_{W_t} \left[ \frac{1}{T} \sum_{t=0}^T R_t(S_t, A_t, W_t) \right]$$

subject to:  $S_{t+1} = f_t(S_t, A_t, W_t)$

$$A_t = \pi(S_t)$$

$$S_0 = s$$

MPC computes an open loop control on finite horizon:

Optimise for finite horizon

$$\text{maximise}_{\{a_t\}} \mathbb{E}_{W_t} \left[ \sum_{t=0}^{H-1} R_t(S_t, A_t, W_t) + V(S_H) \right]$$

subject to:  $S_{t+1} = f_t(S_t, A_t, W_t)$

$$S_0 = s$$

Final cost  
performance for  
robustness

# Back to RL - no model

