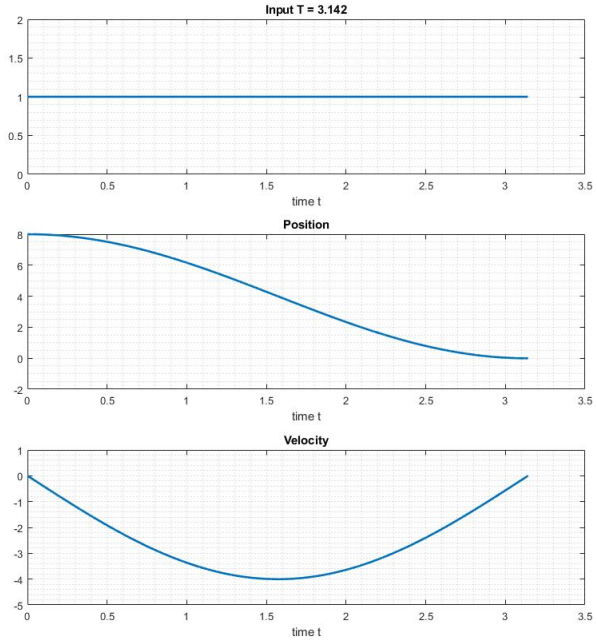
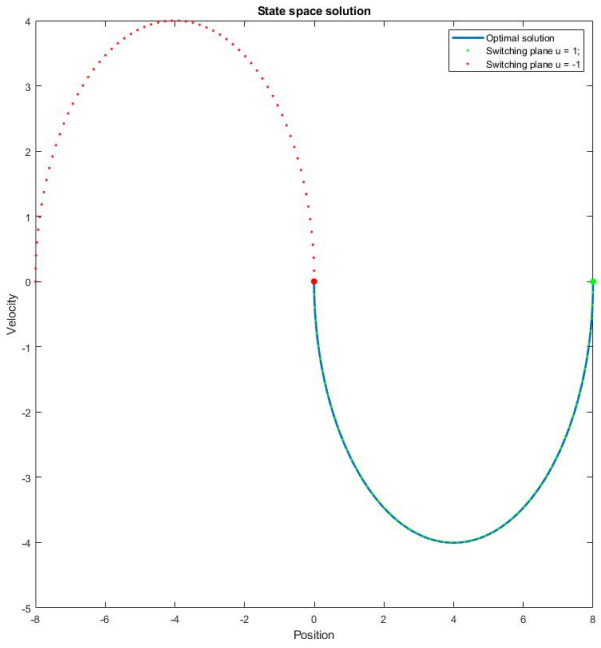
$$(p(0), v(0)) = (8, 0)$$

$$T = 3.142$$

Optimal input $u(t)$, postion $x(t)$ and velocity $v(t)$ with $t \in [0, T]$:



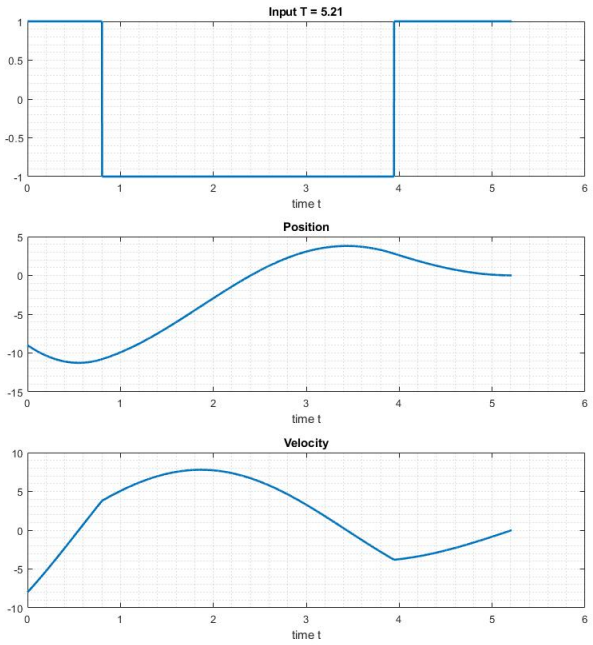
State space plot position $x(t)$ and velocity $v(t)$:



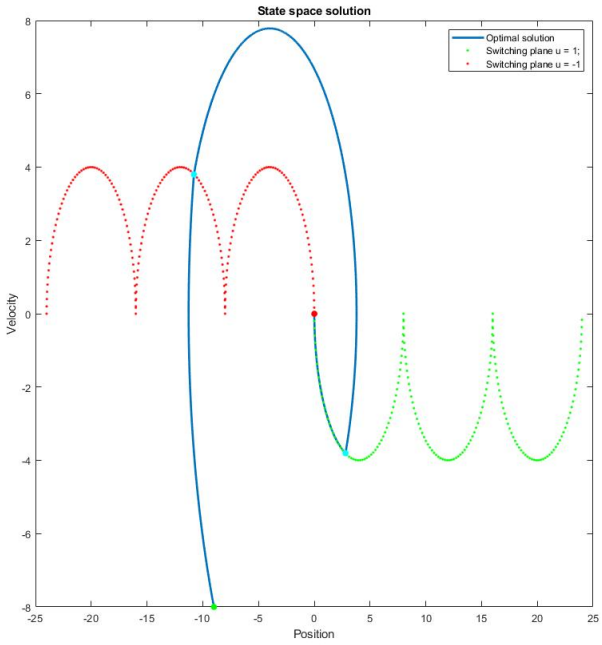
$$(p(0), v(0)) = (-9, -8)$$

$$T = 5.21$$

Optimal input $u(t)$, postion $x(t)$ and velocity $v(t)$ with $t \in [0, T]$:



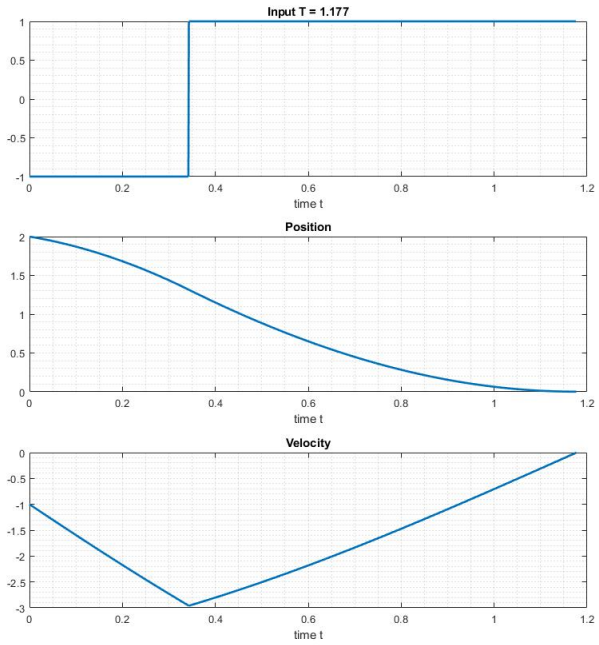
State space plot position $x(t)$ and velocity $v(t)$:



$$(p(0), v(0)) = (2, -1)$$

$$T = 1.177$$

Optimal input $u(t)$, postion $x(t)$ and velocity $v(t)$ with $t \in [0, T]$:



State space plot position $x(t)$ and velocity $v(t)$: