

CARLA Dynamics in RL Braking System

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Dynamics Model

► Plant

$$X_{t+1} = AX_t + Bu_t$$

$$y_t = CX_t + Du_t$$

$$X_t = \begin{bmatrix} d_t \\ v_t \\ a_t \end{bmatrix}, y_t = \begin{bmatrix} d_t \\ v_t \\ a_t \end{bmatrix}$$

$$A = \begin{bmatrix} 1 & -\Delta t & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \end{bmatrix}, B = \begin{bmatrix} 0 \\ \Delta t \\ 1 \end{bmatrix}$$

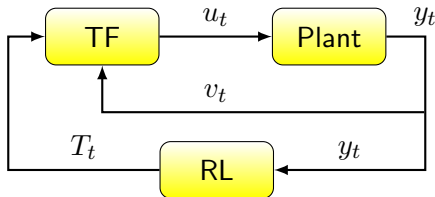
$$C = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}, D = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$

► RL Controller

$$T_t = f_{actor}(y_t)$$

► Transformation

$$u_t = f_{nn}(T_t, v_t)$$



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