$$\boldsymbol{x}_{t+1}$$

$$\approx [(\Delta t A + I) \quad \Delta t B \quad \Delta t C] \phi^x \left(\begin{bmatrix} \boldsymbol{x}_t \\ \boldsymbol{u}_t \end{bmatrix} \right) \quad \text{where} \quad \phi^x \left(\begin{bmatrix} \boldsymbol{x}_t \\ \boldsymbol{u}_t \end{bmatrix} \right) = \begin{bmatrix} \boldsymbol{x}_t \\ \boldsymbol{u}_t \otimes \boldsymbol{x}_t \\ \boldsymbol{u}_t \end{bmatrix}$$

$$\equiv [W^{xx} \quad W^{xxu} \quad W^{xu}] \phi^x \left(\begin{bmatrix} \boldsymbol{x}_t \\ \boldsymbol{u}_t \end{bmatrix} \right)$$