State Transition Matrix

Linearization of States

Example: DAB Model

- DT model is

$$\hat{\boldsymbol{x}}[n] = \boldsymbol{\Phi}\hat{\boldsymbol{x}}[n-1] + \boldsymbol{\Gamma}\hat{\varphi}_{ab}[n-1]$$

with

$$\boldsymbol{\Phi} = e^{\mathbf{A}_3 t_3} e^{\mathbf{A}_2 t_2} e^{\mathbf{A}_1 t_1} \boldsymbol{I}_{HC}$$

$$\boldsymbol{\Gamma} = e^{\mathbf{A}_3 t_3} (\mathbf{A}_2 - \mathbf{A}_3)\mathbf{X}_0$$

where $\boldsymbol{\Phi} \in \Re^{3x3}$ and $\boldsymbol{\Gamma} \in \Re^{3x1}$