

$$\bullet \quad \begin{bmatrix} A_{n \times n} & O_{n \times m} \\ C_{m \times n} & I_m \end{bmatrix} \begin{bmatrix} I_n & O_{n \times m} \\ O_{m \times n} & D_{m \times m} \end{bmatrix} = \begin{bmatrix} A_{n \times n} I_n + \underbrace{O_{n \times m} O_{m \times n}}_0 & \underbrace{A_{n \times n} O_{n \times m} + O_{n \times m} D_{m \times m}}_0 \\ \underbrace{C_{m \times n} I_n + I_m O_{m \times n}}_0 & \underbrace{C_{m \times n} O_{n \times m} + I_m D_{m \times m}}_0 \end{bmatrix} = \\
\begin{bmatrix} A_{n \times n} & O_{n \times m} \\ C_{m \times n} & D_{m \times m} \end{bmatrix}$$

$$\bullet \quad \begin{bmatrix} A_{n \times n} & O_{n \times m} \\ C_{m \times n} & I_m \end{bmatrix} \begin{bmatrix} I_n & A_{n \times n}^{-1} B_{n \times m} \\ O_{m \times n} & D_{m \times m} - C_{m \times n} A_{n \times n}^{-1} B_{n \times m} \end{bmatrix} = \\
\begin{bmatrix} A_{n \times n} I_n + \underbrace{O_{n \times m} O_{m \times n}}_0 & \underbrace{A_{n \times n} A_{n \times n}^{-1} B_{n \times m} + O_{n \times m} D_{m \times m} - O_{n \times m} C_{m \times n} A_{n \times n}^{-1} B_{n \times m}}_0 \\ \underbrace{C_{m \times n} I_n + I_m O_{m \times n}}_0 & \underbrace{C_{m \times n} A_{n \times n}^{-1} B_{n \times m} + I_m D_{m \times m} - I_m C_{m \times n} A_{n \times n}^{-1} B_{n \times m}}_0 \end{bmatrix} = \\
\begin{bmatrix} A_{n \times n} & B_{n \times m} \\ C_{m \times n} & D_{m \times m} \end{bmatrix}$$