

7.5.5

F avb. matris

$$A = \begin{pmatrix} 1 & 2 & 2 & 3 \\ 3 & 2 & 2 & 1 \\ 2 & 1 & 1 & 0 \end{pmatrix}$$

G avb. matris

$$B = \begin{pmatrix} 1 & 1 & 2 & 0 \\ 1 & 2 & 2 & 3 \\ 2 & 1 & 4 & -3 \end{pmatrix}$$

Bestäm $N(F) \cap N(G)$ och $V(F) \cap V(G)$ Lös: $N(F), V(F) \quad AX=0$

$$\left(\begin{array}{cccc|cc} 1 & 2 & 2 & 3 & 0 & x_1 \\ 3 & 2 & 2 & 1 & 0 & x_2 \\ 2 & 1 & 1 & 0 & 0 & x_3 \end{array} \right) \Leftrightarrow \left(\begin{array}{cccc|cc} 1 & 2 & 2 & 3 & 0 & x_1 \\ 0 & -4 & -4 & -8 & 0 & x_2 - 3x_1 \\ 0 & 0 & 0 & 0 & 0 & x_1 - 3x_2 + 4x_3 \end{array} \right)$$

$$V(F): x_1 - 3x_2 + 4x_3 = 0$$

$$N(F) = \begin{cases} x_1 + 2x_2 + 2x_3 + 3x_4 = 0 \\ -4x_2 - 4x_3 - 8x_4 = 0 \end{cases}$$

$$\left(\begin{array}{cccc|cc} 1 & 1 & 2 & 0 & 0 & x_1 \\ 1 & 2 & 2 & 3 & 0 & x_2 \\ 2 & 1 & 4 & -3 & 0 & x_3 \end{array} \right) \Leftrightarrow \left(\begin{array}{cccc|cc} 1 & 1 & 2 & 0 & 0 & x_1 \\ 0 & 1 & 0 & 3 & 0 & x_2 - x_1 \\ 0 & 0 & 0 & 0 & 0 & 3x_1 - x_2 - x_3 \end{array} \right)$$

$$V(G): 3x_1 - x_2 - x_3 = 0$$

$$N(G) = \begin{cases} x_1 + x_2 + 2x_3 = 0 \\ x_2 + 3x_4 = 0 \end{cases}$$

$$N(F) \cap N(G): \left(\begin{array}{cccc|c} 1 & 1 & 2 & 3 & 0 \\ 0 & 1 & 1 & 2 & 0 \\ 1 & 1 & 2 & 0 & 0 \\ 0 & 1 & 0 & 3 & 0 \end{array} \right) \Leftrightarrow \begin{cases} x_1 = t & 1 \\ x_2 = -3t & -3 \\ x_3 = t & 1 \\ x_4 = t & 1 \end{cases}$$

$$V(F) \cap V(G): \begin{cases} x_1 - 3x_2 + 4x_3 = 0 \\ 3x_1 - x_2 - x_3 = 0 \end{cases} \Leftrightarrow \begin{cases} x_1 = 7t & 7 \\ x_2 = 13t & 13 \\ x_3 = 8t & 8 \end{cases}$$