$$\begin{pmatrix} a & b \\ c & d \end{pmatrix}\begin{pmatrix} x & y \\ z & w \end{pmatrix} = \mathbf{0}$$

$$\begin{cases} ax + bz = 0 \\ ay + bw = 0 \\ cx + dz = 0 \\ cy + dw = 0 \end{cases}$$

$$a = 0 \Rightarrow \begin{cases} b = 0, z \neq 0 \\ d = 0 \\ c = 0 \end{cases} \vee \begin{cases} b = 0, z \neq 0 \\ d = -\dfrac{cx}{z} \\ y = \dfrac{wx}{z} \end{cases} \vee \begin{cases} b \neq 0, z = 0 \\ w = 0 \\ c = 0 \end{cases} \vee \begin{cases} b \neq 0, z = 0 \\ w = 0 \\ c \neq 0, x = 0 \\ y = 0 \end{cases} \vee \begin{cases} b = z = 0 \\ c = 0 \\ d = 0 \end{cases} \vee \begin{cases} b = z = 0 \\ c = 0 \\ w = 0 \end{cases} \vee \begin{cases} b = z = 0 \\ c \neq 0, x = 0 \\ y = -\dfrac{dw}{c} \end{cases}$$

$$a \neq 0 \Rightarrow \begin{cases} x = 0 \\ y = 0 \\ z = 0, d \neq \dfrac{bc}{a} \\ w = 0 \end{cases} \vee \begin{cases} x = -\dfrac{bz}{a} \\ y = -\dfrac{bw}{a} \\ d = \dfrac{bc}{a} \end{cases}$$

1,5 $$\begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix}\begin{pmatrix} x & y \\ (z) & w \end{pmatrix} = \mathbf{0}$$

2 $$\begin{pmatrix} 0 & 0 \\ c & -\dfrac{cx}{z} \end{pmatrix}\begin{pmatrix} x & \dfrac{wx}{z} \\ z* & w \end{pmatrix} = \mathbf{0}$$

3 $$\begin{pmatrix} 0 & b* \\ 0 & d \end{pmatrix}\begin{pmatrix} x & y \\ 0 & 0 \end{pmatrix} = \mathbf{0}$$

6 $$\begin{pmatrix} 0 & 0 \\ 0 & d \end{pmatrix}\begin{pmatrix} x & y \\ 0 & 0 \end{pmatrix} = \mathbf{0}$$

7 $$\begin{pmatrix} 0 & 0 \\ c* & d \end{pmatrix}\begin{pmatrix} 0 & -\dfrac{dw}{c} \\ 0 & w \end{pmatrix} = \mathbf{0}$$

8,4 $$\begin{pmatrix} (a) & b \\ c & d \end{pmatrix}\begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix} = \mathbf{0}, ad \neq bc$$

9 $$\begin{pmatrix} a* & b \\ c & \dfrac{bc}{a} \end{pmatrix}\begin{pmatrix} -\dfrac{bz}{a} & -\dfrac{bw}{a} \\ z & w \end{pmatrix} = \mathbf{0}$$