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$$\begin{cases} x+y+z+u=0 \\ x+2y+z-u=0 \end{cases} \text{ の係数拡大行列を記す.}$$

$$\left( \begin{array}{cccc|c} 1 & 1 & 1 & 1 & 0 \\ 1 & 2 & 1 & -1 & 0 \end{array} \right) \xrightarrow{\textcircled{2} + \textcircled{1} \times (-1)} \left( \begin{array}{cccc|c} 1 & 1 & 1 & 1 & 0 \\ 0 & 1 & 0 & -2 & 0 \end{array} \right)$$

$$\xrightarrow{\textcircled{1} + \textcircled{2} \times (-1)} \left( \begin{array}{cccc|c} 1 & 0 & 1 & 3 & 0 \\ 0 & 1 & 0 & -2 & 0 \end{array} \right)$$

$$\Leftrightarrow \begin{cases} x+z+3u=0 \\ y-2u=0 \end{cases} \Leftrightarrow \begin{cases} x = -z-3u \\ y = 2u \end{cases}$$

$$\begin{cases} z = s \\ u = t \end{cases} \text{ とおす.}$$

$$\therefore \begin{pmatrix} x \\ y \\ z \\ u \end{pmatrix} = s \begin{pmatrix} -1 \\ 0 \\ 1 \\ 0 \end{pmatrix} + t \begin{pmatrix} -3 \\ 2 \\ 0 \\ 1 \end{pmatrix} \quad (s, t \text{ は任意定数})$$