

# Examples of Singular Systems

Example with infinitely many solutions:

$$\left[ \begin{array}{ccc|c} 2 & 1 & 1 & 5 \\ 0 & -8 & -2 & -12 \\ 0 & 0 & 0 & 0 \end{array} \right]$$

$$\begin{array}{l} \implies \text{equation 1 is } 2u + v + w = 5 \\ \implies \text{equation 2 is } -8v - 2w = -12 \end{array} \left. \vphantom{\begin{array}{l} \implies \text{equation 1 is } 2u + v + w = 5 \\ \implies \text{equation 2 is } -8v - 2w = -12 \end{array}} \right\} \begin{array}{l} \text{give } w \text{ **any value**} \\ \text{and then solve for} \\ u \text{ and } v \end{array}$$

Note that the last row in the augmented matrix here has no pivot!