

# Gaussian Elimination with Matrices

## Gaussian Elimination (G-E):

- 1 Eliminate  $u$  from rows 2 and 3 by adding to them multiples of row 1
- 2 Eliminate  $v$  from the new row 3 by adding to it a multiple of new row 2

$$\begin{array}{l} \text{Step 1: } R_2 - 2R_1 : \\ \quad R_3 + R_1 : \end{array} \longrightarrow \left[ \begin{array}{ccc|c} 2 & 1 & 1 & 5 \\ 0 & -8 & -2 & -12 \\ 0 & 8 & 3 & 14 \end{array} \right]$$

$$\begin{array}{l} \text{Step 2:} \\ \quad R_3 + R_2 : \end{array} \longrightarrow \underbrace{\left[ \begin{array}{ccc|c} 2 & 1 & 1 & 5 \\ 0 & -8 & -2 & -12 \\ 0 & 0 & 1 & 2 \end{array} \right]}_{\text{equivalent system (same solutions)}}$$