

5. i)  $A = \begin{pmatrix} 1 & 0 \\ 0 & 1 \\ 1 & 1 \end{pmatrix} \quad u = \begin{pmatrix} u_1 \\ u_2 \end{pmatrix}$

$$u_1 = f_1$$

$$u_2 = f_2$$

$$u_1 + u_2 = f_3$$

$$u_1 = 1, u_2 = 1 \quad u_1 + u_2 = 1$$

No solution exists

The first equation states  $u_1 = 1$

The second states  $u_2 = 1$

The 3rd states the sum = 1 which is not possible.

ii)  $\left[ \begin{array}{ccc|c} 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 1 \\ 2 & 2 & 4 & 4 \end{array} \right]$

row  
reduced  
echelon form  $\rightarrow$

$$\left[ \begin{array}{ccc|c} 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 1 \\ 0 & 0 & 0 & 0 \end{array} \right]$$

Infinite solutions

Must satisfy

$$u_1 + u_3 = 1$$

$$u_2 + u_3 = 1$$