

# Linear Algebra I

## Reduced row echelon form

*Computer package problem*

Using Sage or another computer program, compute the row reduced echelon form of each of the following matrices

$$\begin{bmatrix} 0 & 1 \\ 2 & 0 \end{bmatrix}, \quad \begin{bmatrix} 0 & 1 & 0 \\ 4 & 0 & 2 \\ 0 & 3 & 0 \end{bmatrix}, \quad \begin{bmatrix} 0 & 1 & 0 & 0 \\ 6 & 0 & 2 & 0 \\ 0 & 5 & 0 & 3 \\ 0 & 0 & 4 & 0 \end{bmatrix}, \quad \begin{bmatrix} 0 & 1 & 0 & 0 & 0 \\ 8 & 0 & 2 & 0 & 0 \\ 0 & 7 & 0 & 3 & 0 \\ 0 & 0 & 6 & 0 & 4 \\ 0 & 0 & 0 & 5 & 0 \end{bmatrix}, \quad \begin{bmatrix} 0 & 1 & 0 & 0 & 0 & 0 \\ 10 & 0 & 2 & 0 & 0 & 0 \\ 0 & 9 & 0 & 3 & 0 & 0 \\ 0 & 0 & 8 & 0 & 4 & 0 \\ 0 & 0 & 0 & 7 & 0 & 5 \\ 0 & 0 & 0 & 0 & 6 & 0 \end{bmatrix}, \quad \dots$$

Do you spot any pattern? Do you think it persists?

[Exercise from R. Allenby, *Linear Algebra*, Arnold, 1995]