

Row rank different from column rank

Over \mathbf{Z}_{30} consider the matrix $\begin{bmatrix} 1 & 1 & -1 \\ 0 & 2 & 3 \end{bmatrix}$.

The rows are independent but any two columns are dependent. Hence
rowrank = 2 and columnrank = 1.

[Bourbaki, *Algebre*, 1955, Ch. 2, §10, Ex. 3]

Good for Linear Algebra 1, undergraduate !