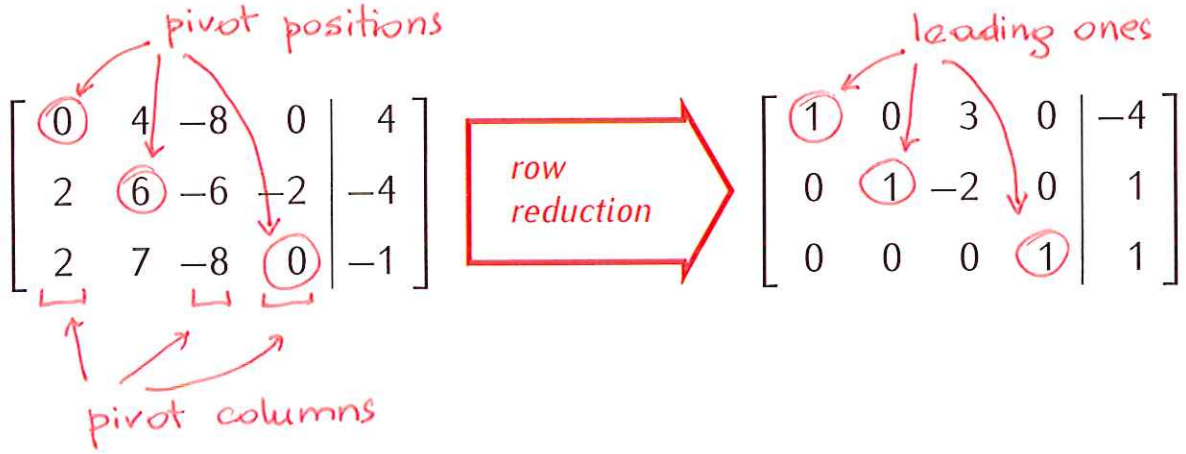

Definition

A *pivot position* in a matrix is a position that after the row reduction contains a leading one.

A *pivot column* of a matrix is a column that contains a pivot position.

Theorem

1) A system of linear equations is inconsistent if and only if the last column of its augmented matrix is a pivot column.

2) Free variables of the system correspond to non-pivot columns of the coefficient matrix.

3) The system has only one solution if and only if every column of its augmented matrix is a pivot column, except for the last column.

Theorem

A system of linear equations can have either 0, 1, or infinitely many solutions.

Proof.