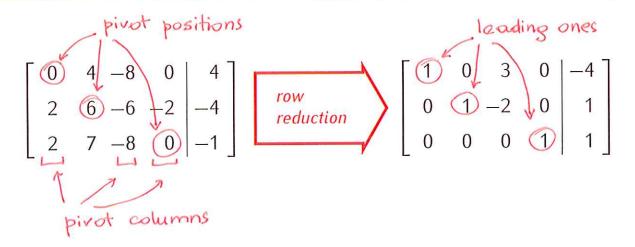
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4. Pivot positions and pivot columns



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.

