Jacobian conjecture

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Synonym	Keller's problem

Let $F\colon \mathbb{C}^n \to \mathbb{C}^n$ be a polynomial map, i.e.,

$$F(x_1, \dots, x_n) = (f_1(x_1, \dots, x_n), \dots, f_n(x_1, \dots, x_n))$$

for certain polynomials $f_i \in \mathbb{C}[X_1, \dots, X_n]$.

If F is invertible, then its Jacobi determinant $\det(\partial f_i / \partial x_j)$, which is a polynomial over $\mathbb{C}$, vanishes nowhere and hence must be a non-zero constant.

The *Jacobian conjecture* asserts the converse: every polynomial map $\mathbb{C}^n \to \mathbb{C}^n$ whose Jacobi determinant is a non-zero constant is invertible.