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Géométrie algébrique réelle, by J. Bochnak, M. Coste and M.-F. Roy. Ergebnisse der Mathematik und ihrer Grenzgebeite, 3 Folge, Band 12, Springer-Verlag, Berlin, Heidelberg, and New York, 1987, x + 375 pp., $118.30. ISBN 3-540-16951-2

Nash manifolds, by Masahiro Shiota. Lecture Notes in Mathematics, vol. 1269, Springer-Verlag, New York, Berlin, Heidelberg, 1987, 273 pp., $20.00. ISBN 0-387-18102-4

One of the basic problems of mathematics is finding the solutions of a system of equations. The easiest case is when the equations are linear and the general form of the set of solutions is well known to every mathematician. The next case one could take is that of polynomials. Suppose we have a collection of polynomials $p_1, p_2, \ldots, p_m$ in n variables with coefficients in some field k. An algebraic set X is the set of common zeroes in k^n of such a set of polynomials, $X = \{x \in k^n \mid p_i(x) = 0,\ i = 1, \ldots, m\}$. Unless one restricts the problem quite a bit (say by taking the p_i's to be quadratic and $n = 3$ and $k =$ the real numbers $\mathbb{R}$) we are nowhere near to completely understanding algebraic sets. Even restricting the polynomials to be quadratic is no help since by adding new variables which are products of the old variables one can reduce the degrees of the polynomials to the point where they are quadratic. (For example $y^2 = x^3$ can be changed to the quadratic $y^2 = xz$, $z = x^2$.)

The study of algebraic sets spawned the field of algebraic geometry which is very active and attracts some of the best mathematicians. However, the natural development of algebraic geometry led to a shift in point of view from the algebraic sets themselves