# PREFACE

THIS introduction to the classical theory of invariants of algebraic forms is divided into three parts of approximately equal length.

Part I treats of linear transformations both from the standpoint of a change of the two points of reference or the triangle of reference used in the definition of the homogeneous coördinates of points in a line or plane, and also from the standpoint of projective geometry. Examples are given of invariants of forms $f$ of low degrees in two or three variables, and the vanishing of an invariant of $f$ is shown to give a geometrical property of the locus $f=0$, which, on the one hand, is independent of the points of reference or triangle of reference, and, on the other hand, is unchanged by projection. Certain covariants such as Jacobians and Hessians are discussed and their algebraic and geometrical interpretations given; in particular, the use of the Hessian in the solution of a cubic equation and in the discussion of the points of inflexion of a plane cubic curve. In brief, beginning with ample illustrations from plane analytics, the reader is led by easy stages to the standpoint of linear transformations, their invariants and interpretations, employed in analytic projective geometry and modern algebra.

Part II treats of the algebraic properties of invariants and covariants, chiefly of binary forms: homogeneity, weight, annihilators, seminvariant leaders of covariants, law of reciprocity, fundamental systems, properties as functions of the roots, and production by means of differential operators. Any quartic equation is solved by reducing it to a canonical form by means of the Hessian (§ 33). Irrational invariants are illustrated by a carefully selected set of exercises (§ 35).