

a point which lies in the polar  $r - 2$  flat of  $\alpha$  qua  $f(\alpha) = 0$ . Whence it follows that any  $r - 2$  flat  $\Sigma u_i \alpha_i = 0$  is invariant to each of the infinitesimal transformations of  $\Gamma$  represented by the poles of this flat qua  $f(\alpha) = 0$ ; and thus, if the poles of this flat do not all lie in an  $r - 2$  flat, it follows that the infinitesimal transformations of  $G$  represented by points in the  $r - 2$  flat  $\Sigma u_i \alpha_i = 0$  generate an invariant subgroup of  $G$ .

If the adjoint group  $\Gamma$  has a quadratic invariant of non-zero discriminant, for a proper choice of the  $X$ 's, we shall have  $c_{ijk} + c_{ikj} = 0$  ( $i, j, k = 1, 2, \dots, r$ ). In this case the condition that  $f(\alpha)$  shall be invariant to  $\Gamma$  is that

$$\Sigma \alpha_i E_i \left( \frac{\partial f(\alpha)}{\partial \alpha_1}, \dots, \frac{\partial f(\alpha)}{\partial \alpha_r} \right) = 0,$$

where  $E_i$  is the matrix whose constituent in the  $\mu$ th row and  $\nu$ th column is  $c_{i\nu\mu}$  ( $i, \mu, \nu = 1, 2, \dots, r$ ); or, what is the same thing, is that

$$\left( \Sigma \alpha_i X_i, \Sigma \frac{\partial f(\alpha)}{\partial \alpha_i} X_i \right) = 0$$

for all values of the  $\alpha$ 's. Whence it follows, if  $f(\alpha)$  is a second invariant of  $\Gamma$ , that the infinitesimal transformation  $\Sigma u_i X_i$  is commutative with every infinitesimal transformation of  $G$  represented by a pole, qua  $f(\alpha) = 0$ , of the  $r - 2$  flat  $\Sigma u_i \alpha_i = 0$ ; and, if these poles do not all lie in any  $r - 2$  flat, it follows that  $\Sigma u_i X_i$  is an exceptional infinitesimal transformation.

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## THE EQUATION OF A RATIONAL PLANE CURVE DERIVED FROM ITS PARAMETRIC EQUATIONS (SECOND PAPER).

BY PROFESSOR J. E. ROWE.

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As this is the second article on the same subject published by the author in the BULLETIN, it is desirable to inform the reader at once that the method of deriving the equation of a rational plane curve from its parametric equations described in this paper is published not merely because it is a new