Hence two contact transformations with the same transversality law will have a point transformation for alternant only when they are of the type

$$W = \sqrt{\alpha + 2\beta p + \gamma p^2}, \quad W_1 = \lambda \sqrt{\alpha + 2\beta p + \gamma p^2}.$$

Transversality is then expressed by a linear involutorial relation (15), *so that for each point the transversal of a given direction is the conjugate direction with respect to a conic with that point as center.*

8. A less important converse result, relating to the type considered in § 3, we state without proof. The only contact transformations which in combination with *every* transformation of type $W = \Omega \sqrt{1 + p^2}$ give a point transformation for alternant are those of the same type. The same is true even if Ω is restricted to the form $a(x^2 + y^2) + bx + cy + d$, a case of interest since then W converts circles into circles. When a vanishes the transformation belongs to the equilong class of Scheffers.

COLUMBIA UNIVERSITY.

ON AN INTEGRAL EQUATION WITH AN ADJOINED CONDITION.

BY ANNA J. PELL.

(Read before the Chicago Section of the American Mathematical Society, December 31, 1909.)

IN his doctor dissertation * Professor Cairns develops for infinitely many variables the theory of a quadratic form with an associated linear form, in order to prove the existence of solutions of the following integral equation :

$$(1) \qquad \phi(s) = \lambda \int_a^b K(s, t)\phi(t)dt + \mu p(s),$$

with the adjoined condition

$$(2) \qquad \int_a^b \phi(s)p(s)ds = 0,$$

where $K(s, t)$ is a given continuous symmetric function of s and t, $p(s)$ a given continuous function of s, λ and μ are parameters, and $\phi(s)$ is the function to be determined.

* "Die Anwendung der Integralgleichungen auf die zweite Variation bei isoperimetrischen Problemen," Göttingen, 1907.