BULLETIN OF THE

AMERICAN MATHEMATICAL SOCIETY.

CONSTRUCTION OF PLANE CURVES OF GIVEN ORDER AND GENUS, HAVING DISTINCT DOUBLE POINTS.

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(Read before the American Mathematical Society, September 10, 1908.)

IN researches in the theory of birational transformations it is frequently desirable to employ curves of given order and given genus, all of whose singularities are ordinary distinct double points; but the possibility of finding such curves has been assumed. In the following note I show that such curves exist for every value of the genus p not exceeding $\frac{1}{2}(n-1)(n-2)$, n being the order of the curve, and determine the equation in each case.

1. Points on the quadric surface $F \equiv xz - yw = 0$ may be defined by simultaneous values of $x_1 : x_2$ and $y_1 : y_2$, where

$$\frac{x}{y} = \frac{w}{z} = \frac{x_1}{x_2}, \quad \frac{x}{w} = \frac{y}{z} = \frac{y_1}{y_2}.$$

An algebraic curve lying on F_2, cutting the generators of one system in r points, and those of the other in $n-r$ points may be expressed by an equation of the form

$$f\left(\overset{r}{\frac{x_1}{x_2}}, \overset{n-r}{\frac{y_1}{y_2}}\right) = 0 \qquad (r \leqq n-r).$$

By multiplying this equation by a suitable power of x_1 and making use of the relations

$$x = x_1 y_2, \quad y = x_2 y_1, \quad z = x_2 y_2, \quad w = x_1 y_1,$$