ADDITION FORMULAS FOR HYPERELLIPTIC FUNCTIONS

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1. *Introduction.** In a recent paper the writer† discussed the Kummer surface associated with the hyperelliptic curve of the form

$$s^2 = r^5 + ar^4 + br^3 + cr^2 + r.$$

This form for the curve was used by A. L. Dixon‡ in a paper in which he obtained addition formulas for hyperelliptic functions with distinct arguments. Dixon emphasizes the unusual symmetry of this particular form for the hyperelliptic curve. In the present paper duplication formulas are found as well as the addition formulas for distinct arguments. The odd functions used here differ from those of Dixon and are slightly different from the ones ordinarily used. The particular form used here seems desirable because of the symmetry.

2. *Distinct Arguments.* Consider the fixed hyperelliptic curve, H, of genus two, given by the equation

$$s^2 = r^5 + ar^4 + br^3 + cr^2 + r, \tag{1}$$

and let L be a variable curve of the form

$$m_0 s = n_0 r^3 + n_1 r^2 + n_2 r + n_3, \qquad m_0 \neq 0. \tag{2}$$

If $n_0 \neq 0$, H and L intersect in six finite points any four of which are sufficient to determine L and hence to determine the remaining two points.

Denote the six points of intersection of H and L by

$$(\alpha_1, \rho_1), \ (\alpha_2, \rho_2), \ (\beta_1, \sigma_1), \ (\beta_2, \sigma_2), \ (\gamma_1, \tau_1), \ (\gamma_2, \tau_2),$$

and let

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† This Bulletin, vol. 38 (1932), p. 403.

‡ *On hyperelliptic functions of genus two,* Quarterly Journal of Mathematics, vol. 36 (1904), p. 1.