THE DETERMINATION OF PLANE NETS CHARACTERIZED BY CERTAIN PROPERTIES OF THEIR LAPLACE TRANSFORMS*

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In a previous number of this Bulletin,† Professor J. O. Hassler discusses plane nets whose first and minus first Laplace transforms each degenerate into a straight line, and finds their canonical differential equations. The determination of these equations requires the solution of two partial differential equations of the first order in two dependent and two independent variables. Since two of Hassler's conditions are $H=K=0$, it follows from the well known theory of the equation of Laplace that the second of equations (1) below can be integrated by quadratures. It will be shown that the entire system (1) can be integrated by quadratures, and a fundamental set of integrals for the canonical system will be obtained.

In order to avoid unnecessary repetition of explanations and computations already contained in Hassler's paper, or in works to which he refers, we shall confine our attention entirely to the integration of the differential equations of the problem. These equations have the form

$$
(1)\qquad \begin{cases} y_{11} = a^{(11)}y_1 + b^{(11)}y_2 + c^{(11)}y, \\ y_{12} = a^{(12)}y_1 + b^{(12)}y_2 + c^{(12)}y, \\ y_{22} = a^{(22)}y_1 + b^{(22)}y_2 + c^{(22)}y, \end{cases}
$$

where $y_1=\partial y/\partial u$, $y_2=\partial y/\partial v$, etc., and where $a^{(ij)}$, $b^{(ij)}$, $c^{(ij)}$, $(i, j=1, 2)$, are functions of u and v, defined in the following manner:

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