# GROUPS OF CREMONA TRANSFORMATIONS IN SPACE OF PLANAR TYPE. II

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1. **Introduction.** We have defined in part I[1] of this account the meaning to be attached to the phrase "of planar type" and have given one example of a group $G$ of this type. It is the purpose of this article to give further examples of groups $G$, which differ in some essential respects from the first.

The stable character of the elements of $G$ is due to the fact that all of the elements have a common $F$-curve of the first kind. In the example given (cf. footnote 1) the elements had in addition variable isolated $F$-points. In the first three examples given below the elements have also an $F$-curve of the first kind, which may vary with the element, and whose nature is dependent upon that of the variable isolated $F$-points. In the fourth example given below there is also a fixed isolated $F$-point.

In order to ensure that the elements of $G$ have a common $F$-curve of the first kind, it is convenient to define $G$ by means of *involutorial* generators. For the first three of our groups $G$ we use generators of types given by Sharpe and Snyder.[2] We develop anew the properties of these generators by a mapping process.

In such a provisional exploration as this, it is convenient to avoid the complications of contact singularities. Simplifying assumptions in this direction are sometimes made.

The first group $G$ developed in §4 is considered in more detail than the later ones. Since the groups $G$ are all associated with linear groups $g$ generated by involutorial elements of a particular arithmetic character, it would seem preferable to discuss the groups $g$ more generally before making applications to the Cremona groups $G$. This the author hopes to do in an early paper.

2. **Webs of cubic surfaces of degree two.** Since the generic surface of a web can have only fixed singularities, we distinguish two cases: (a) the generic surface has no singularities; (b) the generic surface has a node. If, in case (a), $K_1$ is a generic surface of the web, and $\lambda_2 K_2 + \lambda_3 K_3 + \lambda_4 K_4$ a residual net, then this net must cut $K_1$ in a fixed curve $C$ and a variable net of degree two. If this net on $K_1$ has fixed base points, we require them to be *simple* base points. For

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[1] A. B. Coble, *Groups of Cremona transformations in space of planar type*, this journal, vol. 2 (1936), pp. 1–9.

[2] F. R. Sharpe and V. Snyder, *Certain types of involutorial space transformations*, Transactions of the American Mathematical Society, vol. 21 (1930), pp. 52–78.