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Tolga Karayayla* (tkarayay@math.upenn.edu). *Classification of Automorphism Groups of Rational Elliptic Surfaces*. Preliminary report.

In this work the classification given indicates the possible automorphism groups of relatively minimal rational elliptic surfaces according to the configuration of singular fibers on the surface. A relatively minimal rational elliptic surface is equivalent to the blow-up of the projective plane at the 9 base points of a pencil of cubics whose generic element is a smooth cubic. This pencil gives a map to the projective line. The generic fiber of this map is a smooth elliptic curve but there are also singular fibers. The configuration of these singular fibers plays an important role in determining the automorphism group of the surface. The set of sections of the above map is a group called the Mordell-Weil group of the surface, which embeds in the automorphism group of the surface. The Mordell-Weil group is completely determined by the configuration of singular fibers on the elliptic surface as shown by Oguiso and Shioda. If one considers the subgroup of automorphisms preserving the zero section of the surface setwise, then the automorphism group is the semi-direct product of the Mordell-Weil group and this subgroup. This subgroup is a group of order at most 24 and I will present how to determine it from the configuration of singular fibers on the rational elliptic surface. (Received September 22, 2010)