CLASSIFICATION OF BELYI FAMILIES OF CURVES WITH TWO SINGULAR FIBERS

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ABSTRACT. A relatively minimal family of curves $f : S \to \mathbb{P}^1$ with 2 or 3 singular fibers is called a Belyi family or fibration, which has some interesting arithmetic and geometric properties. We classify all Belyi families f of curves of genus $g \geq 2$ with two singular fibers. We compute all sections of f and its Mordell-Weil group. As an application, we prove that any periodic fiber can be realized as a fiber of a Belyi fibration with two singular fibers.

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