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On the Modular Curve X(6) and Surfaces Admitting Genus 2 Fibrations

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Abstract: In this paper, we study the moduli spaces of surfaces admitting nonsmooth genus 2 fibrations with slope $\bullet = 6$ (necessarily) over curves of genus ≥ 1. We determine the structure of each connected component of these moduli spaces. Our results fill the gap of earlier work in the literature to complete the picture of the moduli spaces of genus 2 fibrations over curves of genus ≥ 2 except for the case of $\bullet = 4$.

Key Words: Fibrations, moduli spaces