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We study planar and non-planar degenerations that are related to algebraic surfaces. It is interesting to see the differences in results and research methods between both cases. We have studied already planar degenerations with an R_k singularity, non-planar degenerations of degree 4, 6, and 8. The fundamental groups of the Galois covers of the related surfaces were investigated, because those groups are invariants of classification of algebraic surfaces in the moduli space.

Theorem 1. *The fundamental groups of surfaces that degenerate to one R_k singularity are all trivial, for any k .*

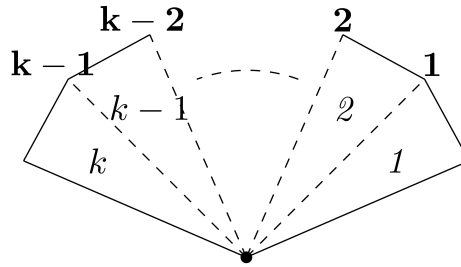


FIGURE 1. R_k singularity

Theorem 2. *The fundamental groups of Galois covers related to non-planar degenerations are trivial (for a degree 4 degeneration), \mathbb{Z}_2^4 (for a degree 6 degeneration), and a metabelian group of order 2^{23} (for a degree 8 degeneration).*

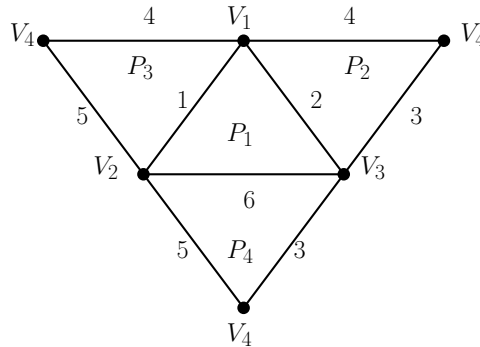


FIGURE 2. Degree 4 non-planar degeneration

REFERENCES

[1] M. Amram, C. Gong, J.-L. Mo, "On the Galois covers of degenerations of surfaces of minimal degree", *Mathematische Nachrichten*, 2023. <https://doi.org/10.1002/mana.202100183>.
 [2] M. Amram, "Fundamental groups of Galois covers as tools to study non-planar degenerations", <https://arxiv.org/abs/2104.02781>.

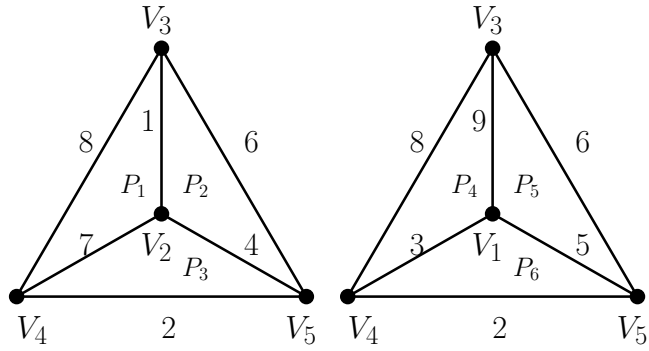


FIGURE 3. Degree 6 non-planar degeneration

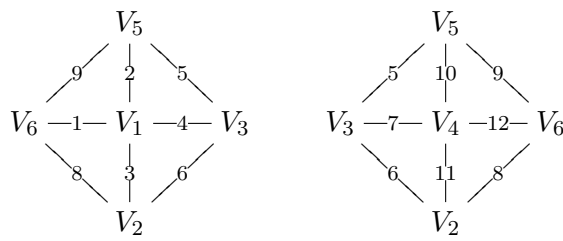


FIGURE 4. Degree 8 non-planar degeneration

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