

**RIEMANN SURFACES: MEETING POINT OF
ALGEBRA, ANALYSIS, GEOMETRY.**

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ABSTRACT. On the Gaussian plane \mathbb{C} every finite subset $D \subset \mathbb{C}$ weighted by a map $m : D \rightarrow \mathbb{Z}$ can be realized as weighted set of zero's and poles with multiplicities of a meromorphic function. Even more can be realized: one can prescribe on the finite set D of zero's and poles freely truncated Laurent series expansions that will be realized by a meromorphic function. Riemann started the study of the possibility of finding meromorphic functions with prescribed truncated Laurent expansions at its zero's and poles on compact Riemann surfaces. This study was seminal and has forced discoveries in many, perhaps all, branches of mathematics. Here only some key words: topology, manifold, differential forms, cohomology, hyperbolic geometry, harmonic analysis, fundamental group, ... The lectures will have as goal the so-called uniformisation theorem for compact connected Riemann surfaces of genus $g > 1$ by a perhaps new proof.

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