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A remark on universal coverings of holomorphic families of Riemann surfaces. (English)

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The authors study the universal covering space \widehat{M} of a holomorphic family (M, π, R) of Riemann surfaces over a Riemann surface R . It is well-known as Koebe's uniformization theorem for a Riemann surface that the universal covering space \widetilde{R} of a complex manifold R of dimension one is given as follows: $\overline{\mathbb{C}}$, \mathbb{C} and the unit disk. However, universal coverings and fundamental groups of complex manifolds of higher dimension are very complicated.

Theorem 1. The universal covering space \widehat{M} of a holomorphic family of Riemann surfaces (M, π, R) of type (g, n) is not biholomorphically equivalent to the two-dimensional unit ball \mathbb{B}_2 provided that (M, π, R) is locally trivial, $n > 0$, or R is not compact.

Theorem 2. The universal covering space \widehat{M} of a holomorphic family of Riemann surfaces (M, π, R) is biholomorphically equivalent to the two-dimensional polydisc Δ^2 if and only if all the fibers $S_t = \pi^{-1}(t)$ are biholomorphically equivalent.

Reviewer: V. V. Chueshev (Kemerovo)

MSC:

[30F10](#) Compact Riemann surfaces and uniformization

[30F60](#) Teichmüller theory for Riemann surfaces

Cited in 1 Document

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