ERRATUM TO 'ISOTOPIES OF HOMEOMORPHISMS OF RIEMANN SURFACES'

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There is an error in the statement and proof of Lemma 5.1 of [1]. The Lemma in question is true in some cases and false in others. The error does not affect the main body of [1], that is Theorems 1,2,3 and 4, but it does imply that Theorem 5, the proof of which uses Lemma 5.1, is true precisely when Lemma 5.1 is true and must be modified when it is false. Theorem 5 of [1] is well-known to be true in the case of hyperelliptic covering spaces of the punctured sphere. That application has been used widely in the mathematical literature. Since [1] was published 43 years ago and has been used by many authors, we checked through the 42 papers that, according to MathSciNet, cited our work, and verified that they had all used Theorems 1-4 but not Theorem 5.

We are grateful to Tyrone Ghaswala, who discovered a counter-example to Lemma 5.1 and pointed out our error to us, and to Ghaswala and Rebecca Winarski, whose preprint [2] gives necessary and sufficient conditions for Lemma 5.1 (and so also Theorem 5) of [1] to hold, and gives a concrete example where they fail to hold. We remark that Winarski's paper [3] reviews the many known generalizations of Theorems 1 and 2 of [1] to covering spaces that (unlike those studied in [1]) are allowed to be regular or irregular, and branched or unbranched. She has settled some, but not all, of the remaining cases, the full generalization being an interesting open problem.

References

[1] Birman, Joan S. and Hilden, Hugh M., *Isotopies of homeomorphisms of Riemann surfaces*, Annals of Mathematics(2), **97** (May 1973), 424-439.

[2] Ghaswala, Tyrone and Winarski, Rebecca, *Lifting homeomorphisms and cyclic branched covers of spheres*, preprint

[3] Winarski, Rebecca, *Symmetry, isotopy, and irregular covers*, Geom. Dedicata **177** (2015), 213-227.