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Erratum to "Asymptotic Expansion of the Heat Kernel for Orbifolds"

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In [1], for each stratum N of the singular set, we define a subgroup $\mathrm{Iso}^{\max}(N)$ of the isotropy group of N. The subgroups $\mathrm{Iso}^{\max}(N)$ play an important role in the heat invariants. In Theorem 5.1 (one of the applications of the heat invariants), there is an implicit assumption that $\mathrm{Iso}^{\max}(N)$ is nontrivial. Thanks to a question from Naveed Bari, we now realize that $\mathrm{Iso}^{\max}(N)$ may be trivial. The strata for which $\mathrm{Iso}^{\max}(N)$ is trivial do not appear in the heat invariants, necessitating the addition of a hypothesis to Theorem 5.1. An example for which $\mathrm{Iso}^{\max}(N)$ is trivial and the modified statement of Theorem 5.1 follow.

Example. On $\mathbb{R}^3$, let r_x, r_y, and r_z denote the rotation through angle π about the x-, y-, or z-axis, respectively. Then $G := \{r_x, r_y, r_z, \mathrm{Id}\}$ is a Klein 4-group acting isometrically on $\mathbb{R}^3$. It is convenient to view the nontrivial elements of G as diagonal matrices with

$$r_x = \begin{bmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -1 \end{bmatrix}, \qquad r_y = \begin{bmatrix} -1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & -1 \end{bmatrix}, \quad \text{and}$$

$$r_z = \begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{bmatrix}.$$

The quotient of $\mathbb{R}^3$ by G is an orbifold. The axes project to 1-dimensional strata, and the origin projects to a 0-dimensional stratum for which $\mathrm{Iso}^{\max}(N)$ is trivial.

5.1. Theorem. *Let $\mathcal{O}$ be a Riemannian orbifold with singularities. If $\mathcal{O}$ is even dimensional (respectively, odd dimensional) and if there exists an odd-dimensional (respectively, even-dimensional) $\mathcal{O}$-stratum N of the singular set with* $\mathrm{Iso}^{\max}(N)$ *nontrivial, then $\mathcal{O}$ cannot be isospectral to a Riemannian manifold.*

We remark that $\mathrm{Iso}^{\max}(N)$ is nontrivial for all strata N that have maximal dimension within any given component of the singular set.

References

[1] E. B. Dryden, C. S. Gordon, S. J. Greenwald, and D. L. Webb, *Asymptotic expansion of the heat kernel for orbifolds,* Michigan Math. J. 56 (2008), 205–238.

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