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CORRECTION TO "SPECTRAL CONVERGENCE ON DEGENERATING SURFACES"

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Lemma 3.3 of [2] is incorrect. The asserted lower bound on the isoperimetric constant was used in the proofs of Lemma 3.4 and the claim on p. 480 to give an L^∞ bound on eigenfunctions. In this note, we shall replace Lemma 3.3 with a direct proof of these bounds (Proposition 2 below). We apologize for this error.

Lemma 1. *Let M_ε be as in Lemma 3.3. Set $N_\varepsilon = M_\varepsilon \backslash M_1$. Then there exists a constant $c > 0$ such that for all $0 \leqslant \varepsilon < 1$, $\mathscr{I}(N_\varepsilon) \geqslant c > 0$.*

Proof. The statement follows from a simpler version of the argument used in the proof of Proposition 2.6. □

Let $\psi_{k,\varepsilon}$ be normalized eigenfunctions for the Dirichlet problem on N_ε with eigenvalues $\mu_{k,\varepsilon}$, and let $\varphi_{n_i,\varepsilon_j}$ be the normalized eigenfunctions for the Dirichlet problem on M_{ε_j} with eigenvalues $\lambda_{n_i,\varepsilon_j}$ considered in the proof of Lemma 3.4 and the claim on p. 480.

Proposition 2. *For each i there is a constant B_i such that $\|\varphi_{n_i,\varepsilon_j}\|_\infty \leqslant B_i$ for all ε_j.*

Proof. For notational simplicity, we suppress the subscript n_i. Let η_1, η_2 be smooth cutoff functions on M satisfying the following conditions:
(i) $\eta_1 + \eta_2 \equiv 1$;
(ii) $\eta_1 \equiv 0$ on $M \backslash M_{1/2}$;
(iii) $\eta_2 \equiv 0$ on $M_{3/4}$.
Furthermore, we may choose η_1, η_2 in such a way as to guarantee uniform L^2 bounds on $\Delta^m(\eta_1\varphi_{\varepsilon_j})$ and $\Delta^m(\eta_2\varphi_{\varepsilon_j})$ depending on m and on λ_{ε_j}, but not otherwise on ε_j. To see this, note that by (ii), $d\eta_1$ and $d\eta_2$ are supported in $M_{1/4}$, where the higher derivatives of φ_{ε_j} may be uniformly bounded by an application of the elliptic estimate (cf. the proof of Lemma 3.5).

Clearly, it suffices to bound $\eta_1\varphi_{\varepsilon_j}$ and $\eta_2\varphi_{\varepsilon_j}$ separately. Consider the Fourier expansions

$$\eta_1\varphi_{\varepsilon_j} = \sum_{k=1}^{\infty} a_k(\varepsilon_j)\varphi_{k,1/4}, \qquad \eta_2\varphi_{\varepsilon_j} = \sum_{k=1}^{\infty} b_k(\varepsilon_j)\psi_{k,\varepsilon_j}.$$

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