Erratum to

On the First Eigenvalue of the Linearized Operator of the r-th Mean Curvature of a Hypersurface*

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The proof of Theorem 3.1 in our paper [1] is incorrect: It is not true that the maps $(\widetilde{X}, x) \mapsto (T\widetilde{X}, x)$ are isometries of $\mathbf{H}^{m+1}$, T a translation of $\mathbf{R}^{m+1}$. To correct this one uses the test functions introduced in [2].

Let $\widetilde{X} = \int_M X$. Then $\langle X, X\rangle = -1$ implies $\langle \widetilde{X}, \widetilde{X}\rangle < 0$. Let $U_0 = \widetilde{X}/|\widetilde{X}|$ and $U_1, \dots, U_{m+1}$ be a completion of U_0 to an orthonormal basis of $\mathbf{R}^{m+2}$ with the Lorentz metric.

Let $n_i = \langle N, U_i\rangle$ and $x_i = \langle X, U_i\rangle$, so that $\int_M x_i = 0$ for $i = 1, 2, \dots, m+1$.

Let $L = L_r$, so

$$L(x_i) = \langle (L(X), U_i\rangle = -c(r)(H_{r+1} n_i - H_r x_i).$$

Since $\langle N, X\rangle = 0$ and $\langle X, X\rangle = -1$,

$$0 = -n_0 x_0 + \sum_{i=1}^{m+1} n_i x_i \quad \text{and} \quad -1 = -x_0^2 + \sum_{i=1}^{m+1} x_i^2.$$

Taking an adapted frame field $\varepsilon_0 = X, \varepsilon_1, \dots, \varepsilon_m, \varepsilon_{m+1} = N$ one has

$$-1 = \langle U_0, U_0\rangle = -\langle U_0, X\rangle^2 + \sum_1^m \langle U_0, \varepsilon_i\rangle^2 + \langle U_0, N\rangle^2 \geq -x_0^2 + n_0^2,$$

so $x_0^2 \geq 1 + n_0^2$, and

$$x_0 n_0 \leq \frac{x_0^2 + n_0^2}{2} \leq x_0^2 - \frac{1}{2} = (x_0^2 - 1) + \frac{1}{2}.$$

Now $\int_M x_i = 0$ for $i = 1, \dots, m+1$ implies

$$\lambda_1 \int_M x_i^2 \leq -\int_M x_i L(x_i) = c(r) \int_M H_{r+1} n_i x_i - H_r x_i^2.$$

The proof is then completed as in our paper [1].

References

[1] ALENCAR, H.; DO CARMO, M.; ROSENBERG, H.: On the First Eigenvalue of the Linearized Operator of the r-th Mean Curvature of a Hypersurface. *Ann. Global Anal. Geom.* **11** (1993), 387–395.

* (See [1].)

[2] BARBOSA, J.L.; DO CARMO, M.; ESCHENBURG, J.: Stability of Hypersurfaces of Constant Mean Curvature in Riemannian Manifolds. *Math. Z.* **197** (1988), 123–138.