ADDENDUM FOR "QUANTITATIVE OSCILLATION ESTIMATES FOR ALMOST-UMBILICAL CLOSED HYPERSURFACES IN EUCLIDEAN SPACE"

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We want to make an additional comment on [2, Thm. 1.1]. Unfortunately only after the publication of this paper we learned about the paper [1], which implies our result using standard results and a simple calculation. However, the methods of the proofs differ tremendously. In [1] the author uses projection methods onto 3-dimensional subspaces and standard pinching results for surfaces, whereas we use estimates in terms of L^p pinchings.

In fact, with our method it is also possible to prove closeness estimates in terms of $\|\mathring{A}\|_p$, namely that for $p > n$ and a closed and strictly convex hypersurface with $|M| = 1$ we find constants $\beta = \beta(p, n)$ and $\epsilon_0 = \epsilon_0(n, p, \|A\|_p)$, such that if $\epsilon < \epsilon_0$ and

$$\|\mathring{A}\|_p \leq \|H\|_p \epsilon,$$

then

$$\operatorname{dist}(M, S_R) \leq c\epsilon^\beta.$$

Here one also has to be careful with the proposed exponent $\beta = \frac{1}{2+\alpha}$. β will in general become smaller when p gets closer to n. If we are not dealing with the case $p = \infty$, in which we would even obtain $\beta = 1$ due to [1], we are not aware how β behaves in dependence of $p > n$.

References

[1] Kurt Leichtweiß, *Nearly umbilical ovaloids in the n-space are close to spheres*, Result. Math. **36** (1999), no. 1-2, 102–109.

[2] Julian Scheuer, *Quantitative oscillation estimates for almost-umbilical closed hypersurfaces in Euclidean space*, Bull. Aust. Math. Soc. **92** (2015), no. 1, 133–144.