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Correction to: On the Measure and the Structure of the Free Boundary of the Lower Dimensional Obstacle Problem

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Abstract

One of the propositions of the paper on the classification of homogeneous solutions was found to be incorrect. It follows that the second half of the proof of Theorem 1.3 no longer holds. We thank Xavier Fernández-Real for pointing this mistake out to us.

Proposition 8.2 of the paper (whose proof was postponed to the Appendix, Proposition A.3) is incorrect: e.g., the harmonic polynomial

$$u(x) = x_1^2 x_2^2 - x_3^2(x_1^2 + x_2^2) + \frac{x_3^4}{3}$$

is even symmetric with respect to x_3, its coincidence set $\Lambda(u)$ contains the line $\{x_2 = x_3 = 0\}$ but it is not of the claimed form $c\, h_4(x_2, x_3)$. More precisely, there is a mistake in the inductive argument of the proof of Proposition A.3.

As a consequence, the proof of the second half of Theorem 1.3, concerning the uniqueness of blowups at almost all points with frequency $2m$ and $2m - 1 + s$, does not hold. However, as pointed out in the paper, the uniqueness of the blowups at every singular point (i.e. points with frequency $2m$) follows from a different argument given in the references [26, 29]. To the best of our knowledge, the uniqueness at almost all points with frequency $2m - 1 + s$ has to be considered an open problem.

We thank Xavier Fernández-Real for pointing out to us this mistake and the counter-example.

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