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CORRIGENDUM

Optimisation of the geometry of axisymmetric point-absorber wave energy converters – CORRIGENDUM

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While performing laboratory experiments to validate and further explore the findings from our paper (Edwards & Yue 2022), we discovered an error in our application of WAMIT, the numerical model used to find the hydrodynamic coefficients when performing the optimisations. For our axisymmetric geometries, this application error only affects results when the generative curve of the body boundary is multi-valued vertically. Boundary profiles that do not have this property are not affected. The problem assumptions and theory (§ 2), optimisation framework (§ 3) and approach (§ 4) have not been affected. Furthermore, § 5.1 has not been affected – that is, in the heave-only problem, constraint boundaries are still shown to provide the class optimal. The main change is in the exact geometries emerging from the optimisations of the groups which contain bodies whose boundary profiles are multi-valued vertically (cases OK, NK2O, FB, CC in the original paper). Correcting the application error is straightforward, and the optimisations have been re-run. The corrected geometries are shown in figure 1 (corrected figure 5) for the heave-only case and in figure 2 (corrected figure 6) for the heave-surge-pitch case. The corresponding values for geometric parameters in the supplementary information have been updated.

The general trends of the optimal bodies are largely unaffected. Specifically, the optimal geometries still tend to protrude outwards below the waterline (§ 5.3.1), and the optimal heave-surge-pitch geometries are generally wider than the optimal heave-only geometries (§ 5.3.3). However, the observed trend that 'the maximum radius generally occurs close to the waterline' (§ 5.3.2) is no longer observed. For the corrected optimal shapes, the maximum radius generally occurs mid-draft, resulting in a more wall-sided shape at the waterline. Since a geometry that has a steep slope close to the waterline is generally more affected by nonlinear forces, the new shapes are more realistic for practical wave energy conversion. Note that there are now no emerging shapes from the heave-surge-pitch optimisation for $\alpha_0 = 1$.

Finally, the overall optimal heave-only geometry for $\alpha_0 = 3$, $\epsilon_0 = 0.1$, labeled $\mathcal{S}_O$ and discussed in § 5.4, is now different. The new $\mathcal{S}_O$ is shown in figure 1 and has a nondimensionalised radius of $R = 0.52$, nondimensionalised draft of $H = 0.46$, and the new overall smallest value for l_S is 1.47. As a comparison, the result for the optimal cylinder

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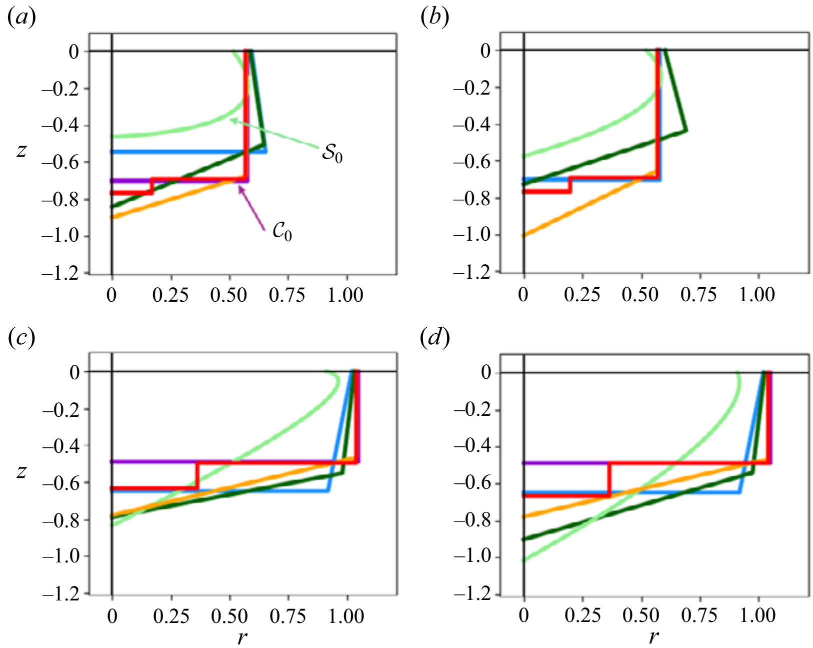

Figure 1. Corrected Figure 5: Generating $\mathcal{S}$ curves of the optimal geometries for the heave-only problem with constraint constants (*a*) $\alpha_0, \epsilon_0 = 0.1$, (*b*) $\alpha_0 = 3, \epsilon_0 = 0.2$, (*c*) $\alpha_0 = 1, \epsilon_0 = 0.1$, (*d*) $\alpha_0 = 1, \epsilon_0 = 0.2$. Groups (described in § 4.4): CYL, purple; FB, blue; WS, orange; OK, dark green; NK2O, light green; CC, red.

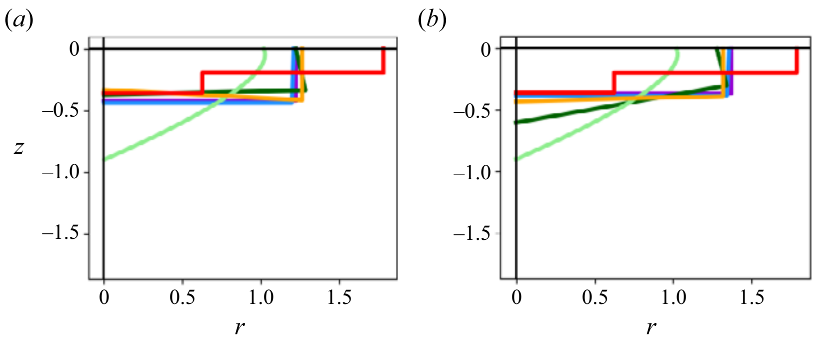

Figure 2. Corrected Figure 6: Generating $\mathcal{S}$ curves of the optimal geometries for the heave-surge-pitch problem with constraint constants (*a*) $\alpha_0, \epsilon_0 = 0.1$, (*b*) $\alpha_0 = 3, \epsilon_0 = 0.2$. Groups (described in § 4.4): CYL, purple; FB, blue; WS, orange; OK, dark green; NK2O, light green; CC, red.

with the same constraints ($\mathcal{C}_O$) is not affected ($l_S = 1.86$, $R = 0.58$, $H = 0.7$, labeled in figure 1) nor is the optimal hemisphere ($R = 1.05$, $l_S = 2.64$). The new optimal shape $\mathcal{S}_O$ now has a 38 % smaller surface area than the optimal cylinder $\mathcal{C}_O$ and 69 % smaller surface area than the hemisphere. Figure 10 and the resulting discussion on irregular incident waves will change with the new $\mathcal{S}_O$, but the inference that the current optimisation framework generally works well for relatively narrow-banded spectra is still consistent.

Supplementary material. Supplementary material is available at https://doi.org/10.1017/jfm.2024.1016.

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