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CORRIGENDUM

High-order strongly nonlinear long wave approximation and solitary wave solution – CORRIGENDUM

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I have discovered that there was an error in one of the second-order equations (the evolution equation for ϕ_b) given by (5.12*b*) in Choi (2022), which will be hereinafter referred to as C22. The correct evolution equation for ϕ_b is given by

$$\left[\left\{1-\frac{\eta^2}{2!}+\frac{\eta^4}{4!}(\nabla^2)^2\right\}\phi_b\right]_t+g\zeta+\frac{1}{2}\nabla\phi_b\cdot\nabla\phi_b$$
$$=\nabla\cdot\left(\frac{\eta^2}{2!}\nabla^2\phi_b\nabla\phi_b\right)-\nabla\cdot\left[\frac{\eta^4}{4!}\nabla\phi_b(\nabla^2)^2\phi_b+\frac{\eta^4}{16}\nabla(\nabla^2\phi_b)^2\right]. \tag{0.1}$$

While the recursive formulas in C22 are correct, a mistake was made when the second-order model was simplified. As a result, the second-order evolution equation for $v=\phi_{b_x}$ for one-dimensional waves given by (6.1*b*) in C22 is also incorrect. The evolution equation should read

$$\left[v-\left(\frac{\eta^2}{2!}v_x-\frac{\eta^4}{4!}v_{xxx}\right)_x\right]_t+g\zeta_x+vv_x=\left[\frac{\eta^2}{2!}vv_x-\frac{\eta^4}{4!}(vv_{xxx}+3v_xv_{xx})\right]_{xx}. \tag{0.2}$$

Notice that the coefficient for v_xv_{xx} on the right-hand side has been changed to 3 from 5 in C22.

The numerical results presented in figures 9, 11, and 12 in C22 are recomputed with the corrected second-order system, but the new numerical solutions are found close to the previous solutions as the error was introduced in the high-order dispersive terms of $O(\beta^4)\ll 1$. Therefore, no new numerical solutions are presented here although they are made available at https://web.njit.edu/~wychoi/pub/Choi22~newfigures.pdf. It should be remarked that the maximum difference between the new and old solutions, for example, for the head-on collision of two-counter propagating solitary waves presented in figure 12 in C22 is found about 3.76 %. Therefore, the discussion about the second-order model in C22 remains valid. In the meantime, the loss of the truncated energy for the second-order model is found 0.179 % at $t/(h/g)^{1/2}=200$ for the propagation of a single solitary wave presented in figure 9 and 0.198 % at $t/(h/g)^{1/2}=20$ for the head-on collision of two solitary waves in figure 11, instead of 0.230 % and 0.130 %, respectively, reported in C22.

REFERENCE

CHOI, W. 2022 High-order strongly nonlinear long wave approximation and solitary wave solution. *J. Fluid Mech.* **945**, A15.