Erratum: Inertial Migration in a Pressure-Driven Channel Flow: Beyond the Segre-Silberberg Pinch [Phys. Rev. Lett. 132, 054002 (2024)]

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(Received 9 October 2024; published 6 December 2024)

DOI: 10.1103/PhysRevLett.133.239904

There was an algebraic error in the calculation of the finite size contribution in Eq. (4) of the Letter. The correct expression for the inertial lift velocity is

$$V_p(s) = \mathrm{Re}_p[F_1(s, \mathrm{Re}_c) + 8\lambda(1 - 2s)]. \tag{1}$$

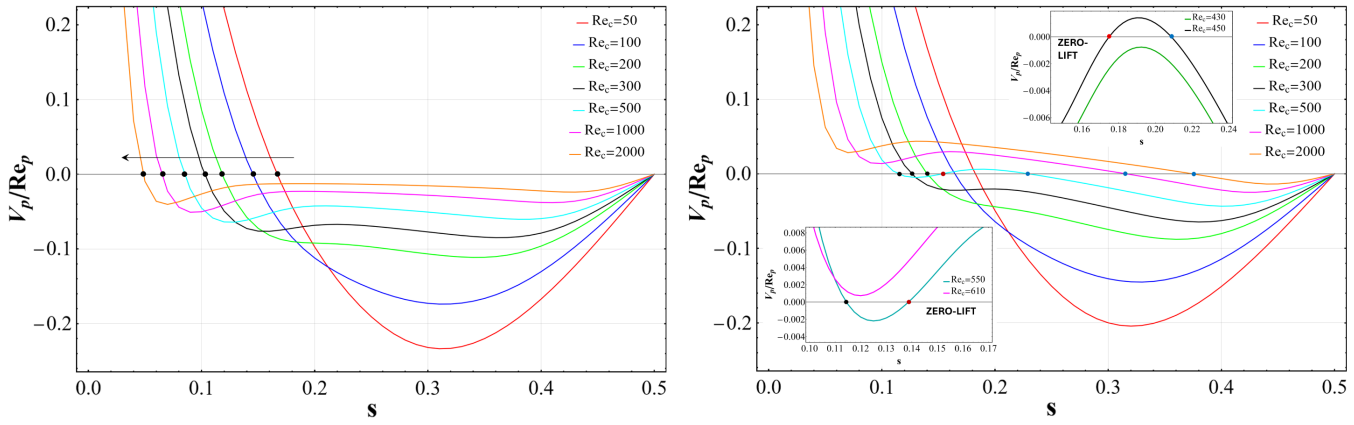
The only difference between (1), and Eq. (4) in the Letter, is the numerical prefactor in the $O(\lambda)$ term within square brackets; the original coefficient, $1141/216$, is now replaced by 8. While this change implies that the channel Reynolds numbers (Re_c's), at which the finite-size-induced bifurcations occur, are altered, all of these alterations are purely quantitative in nature; the finite-size contribution being slightly more dominant than in the Letter. The physical arguments and implications of the finite-size correction, discussed in the Letter, remain unchanged.

In this Erratum, we present corrected versions of Figs. 2, 3, and 4 of the Letter.

Corrections to the Letter—Figure 2 of the Letter should be replaced by Fig. 1 here.

Figures 3 and 4 of the Letter should be replaced by Figs. 2 and 3, respectively.

Conclusions—In this Erratum, we correct the expression for the finite-size contribution. We still observe the saddle-node bifurcations responsible for generating new equilibria closer to the channel centerline. The only change is that these bifurcations now occur for a smaller value of λ, for a given Re_c, resulting in the region of multiple equilibria (region ② in Fig. 3) shifting down, along the line $\mathrm{Re}_c = 296$, as compared to Fig. 4 in the Letter.



(a) $\lambda = 0$ (point-particle) (b) $\lambda = 0.01$

FIG. 1. Inertial lift profiles in the lower half-channel for $\mathrm{Re}_c \in [50, 2000]$: (a) $\lambda = 0$ [point-particle profile $F_1(s, \mathrm{Re}_c)$]; (b) $\lambda = 0.01$. The arrow in (a) shows the movement of the SS equilibrium with increasing Re_c. The black, red, and blue symbols in (b) denote the SS, unstable and stable equilibria, respectively; the insets in (b) provide a magnified view of the saddle-node bifurcations at $\mathrm{Re}_{c_1}^{\mathrm{threshold}} \approx 436$ and $\mathrm{Re}_{c_2}^{\mathrm{threshold}} \approx 593$.

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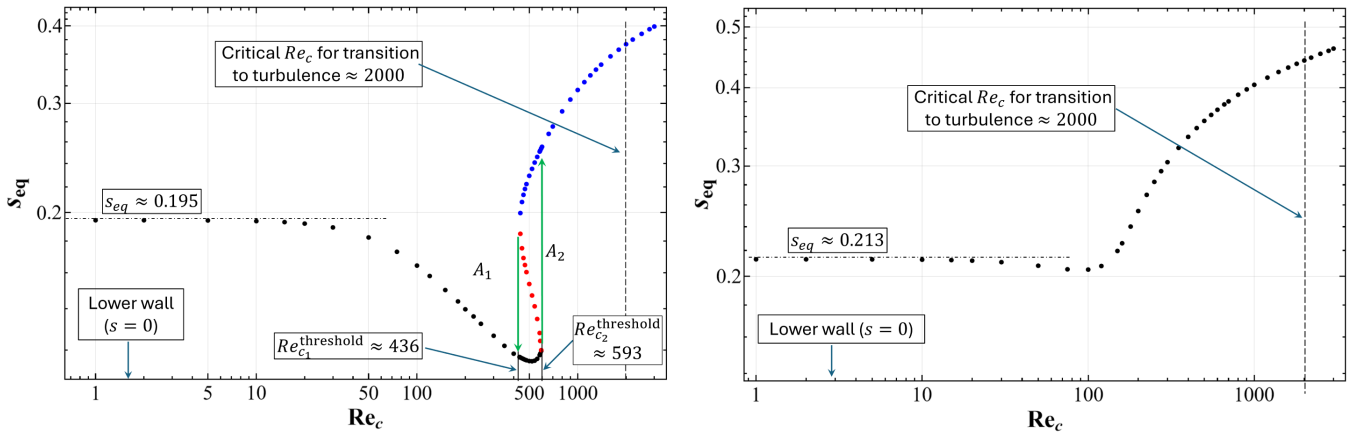

FIG. 2. Inertial equilibrium loci for (a) $\lambda = 0.01$ and (b)$\lambda = 0.025$; black, blue, and red dots denote the SS, and the inner stable and unstable equilibria, respectively. The interval of multiple equilibria, $\mathrm{Re}_c \in (436, 593)$ in (a), leads to hysteretic jumps in the equilibrium location marked by green arrows (A_1: $s_{\mathrm{eq}} \equiv 0.2 \to 0.117$ and A_2: $s_{\mathrm{eq}} \equiv 0.12 \to 0.25$). Vertical dashed lines in (a) and (b) denote the laminar-turbulent transition.

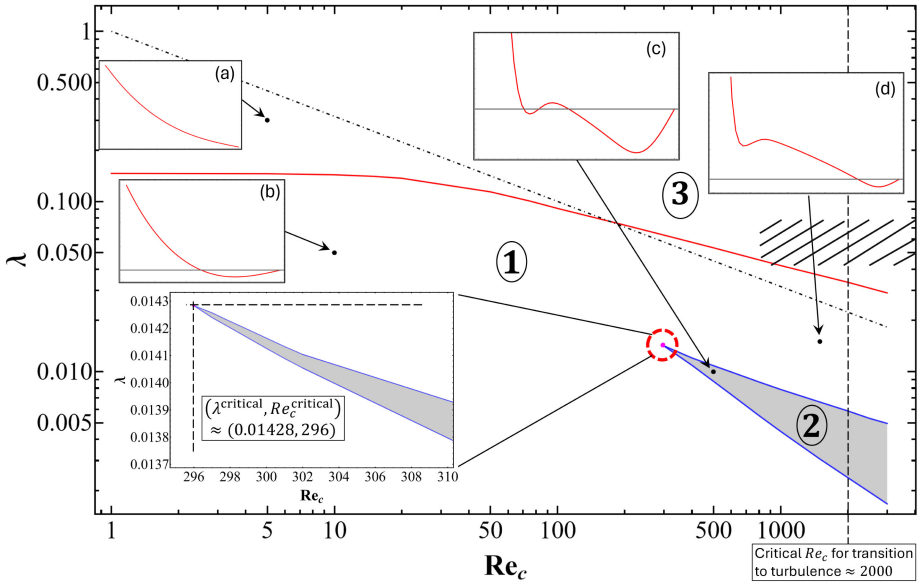

FIG. 3. Migration scenarios in the $\lambda - \mathrm{Re}_c$ plane. Top four insets show inertial lift profiles for the following (λ, Re_c): (a)(0.3,5); (b)(0.05,10); (c)(0.01,500); (d)(0.015,1500); bottom left inset shows the neighborhood of the cusp. The hatched region corresponds to the parameter ranges covered in earlier studies [1–5].

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