Erratum: Artificial bottleneck effect in large eddy simulations [Phys. Rev. Fluids 9, 084605 (2024)]

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It has come to our attention that a minor bug was present in the implementation of the mixed model calculation in our original publication. Upon identifying and correcting the bug, we recomputed the relevant results and updated the affected figures and tables. The revised plots exhibit very slight differences from the original versions, but these changes do not alter the main findings, conclusions, or interpretations presented in the paper.

For completeness, we provide the corrected figures and tables below (see Tables I–IV and Figs. 1–5). In the tables, the corrected values are given in boldface, followed by the original values, to facilitate comparison.

We would like to express our gratitude to Rahul Arun for bringing this issue to our attention.

TABLE I. Statistical comparison of LES models with Gaussian-filtered DNS at $\ell = 24\eta$ with 128^3 resolution ($\kappa_{\max}\ell = 3.0$). This table corresponds to Table II in the original paper.

Model	$\langle S_{ij}S_{ij}\rangle\tau_\eta^2$	$\langle\Pi_{s1}\rangle/\langle\Pi\rangle$	$\langle\Pi_{\omega1}\rangle/\langle\Pi\rangle$	$\langle A_{11}^3\rangle/\langle A_{11}^2\rangle^{3/2}$	$\langle A_{11}^4\rangle/\langle A_{11}^2\rangle^2$	$\langle A_{12}^4\rangle/\langle A_{12}^2\rangle^2$
Filtered DNS (fDNS)	1.7×10^{-2}	0.37	0.12	−0.42	3.9	4.7
SFR Eq. mixed (eq.dmix)	$\mathbf{1.8\times10^{-2}}$	**0.40**	**0.13**	**−0.39**	**3.8**	**4.6**
SFR Eq. mixed (eq.dmix)	1.8×10^{-2}	0.41	0.14	−0.39	3.8	4.6
SFR mixed (dmix.avg)	$\mathbf{1.9\times10^{-2}}$	**0.45**	**0.15**	**−0.39**	**3.9**	**4.8**
SFR mixed (dmix.avg)	1.9×10^{-2}	0.45	0.15	−0.41	4.0	4.9

TABLE II. Statistical comparison of SFR-based models resolved dissipation rate with Gaussian-filtered DNS and Smagorinsky models at $\kappa_{\max}\ell = 3.0$ with different filter widths ℓ at $\mathrm{Re}_\lambda = 400$. L_{box} is the simulation domain box size (2π) where $L/L_{\text{box}} = 0.21$ (L is the integral length scale), and $\tau_\ell/\tau_\eta = (5.24, 8.33, 13.2)$ for DNS respectively. This table corresponds to Table III in the original paper.

	$\ell = 0.005L_{\text{box}}$	$\ell = 0.01L_{\text{box}}$	$\ell = 0.02L_{\text{box}}$
Filter width	$\ell = 12\eta$	$\ell = 24\eta$	$\ell = 48\eta$
Model	$\langle S_{ij}S_{ij}\rangle\tau_\ell^2$	$\langle S_{ij}S_{ij}\rangle\tau_\ell^2$	$\langle S_{ij}S_{ij}\rangle\tau_\ell^2$
fDNS	1.22	1.14	1.13
eq.dmix	**1.21**	**1.23**	**1.25**
eq.dmix	1.24	1.27	1.29

TABLE III. Statistical comparison of SFR-based models kinetic energy with Gaussian-filtered DNS and Smagorinsky models at $\kappa_{\max}\ell = 3.0$ with different filter widths ℓ at $\mathrm{Re}_\lambda = 400$; L_{box} is the box size. This table corresponds to Table IV in the original paper.

Filter width	$\ell = 0.005L_{\mathrm{box}}$			$\ell = 0.01L_{\mathrm{box}}$			$\ell = 0.02L_{\mathrm{box}}$		
	$\ell = 12\eta$			$\ell = 24\eta$			$\ell = 48\eta$		
Model	$\langle e\rangle$	$\langle E\rangle$	$\langle T\rangle$	$\langle e\rangle$	$\langle E\rangle$	$\langle T\rangle$	$\langle e\rangle$	$\langle E\rangle$	$\langle T\rangle$
fDNS	0.07	0.66	0.73	0.12	0.61	0.73	0.20	0.53	0.73
eq.dmix	**0.09**	**0.69**	**0.78**	**0.15**	**0.64**	**0.79**	**0.22**	**0.56**	**0.78**
eq.dmix	0.09	0.68	0.77	0.15	0.63	0.78	0.24	0.55	0.79

TABLE IV. Statistical comparison of SFR-based models resolved dissipation rate $\langle S_{ij}S_{ij}\rangle\tau_\ell^2$ with the ideal infinite-Re filtered spectrum and Smagorinsky models at $\kappa_{\max}\ell = 3.0$ with different filter widths ℓ at $\mathrm{Re}_\lambda = \infty$; L_{box} is the box size. This table corresponds to Table V in the original paper.

Filter width Model	$\ell = 2.5\text{e-}3L_{\mathrm{box}}$ $\langle S_{ij}S_{ij}\rangle\tau_\ell^2$	$\ell = 0.005L_{\mathrm{box}}$ $\langle S_{ij}S_{ij}\rangle\tau_\ell^2$	$\ell = 0.01L_{\mathrm{box}}$ $\langle S_{ij}S_{ij}\rangle\tau_\ell^2$	$\ell = 0.02L_{\mathrm{box}}$ $\langle S_{ij}S_{ij}\rangle\tau_\ell^2$
fDNS	1.08	1.08	1.07	1.05
eq.dmix	**1.21**	**1.23**	**1.25**	**1.26**
eq.dmix	1.25	1.27	1.29	1.30

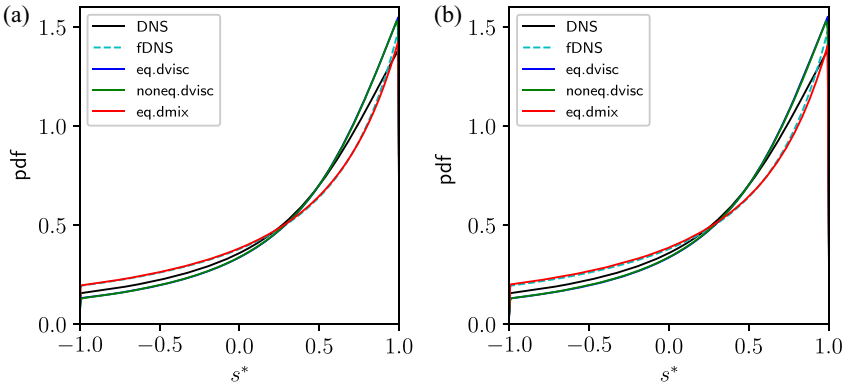

FIG. 1. PDF of $s^\star$ for LES with three different models compared with DNS and filtered DNS: (a) the corrected results, and (b) the original version. This figure corresponds to Fig. 4(a) in the original paper.

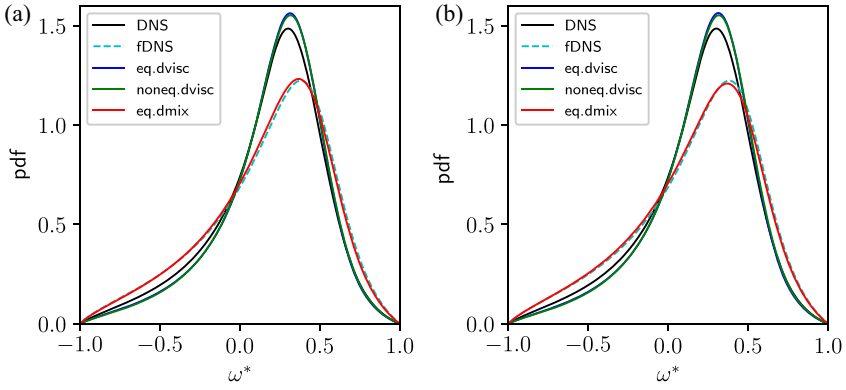

FIG. 2. PDF of $\omega^\star$ for LES with three different models compared with DNS and filtered DNS: (a) the corrected results, and (b) the original version. This figure corresponds to Fig. 4(b) in the original paper.

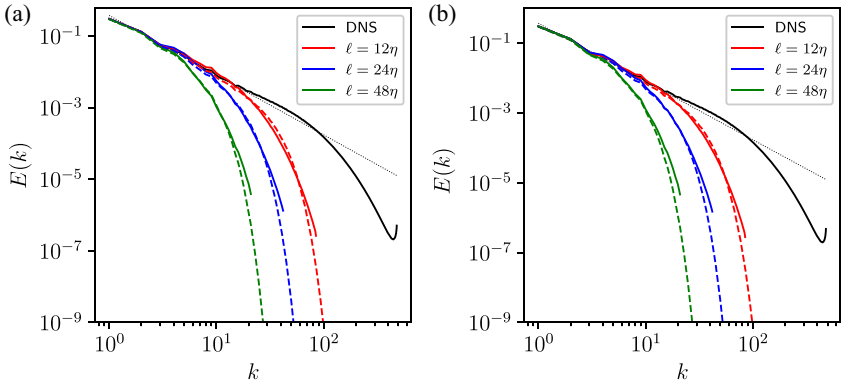

FIG. 3. Energy spectra for *a posteriori* testing at $\kappa_{\max}\ell = 3.0$ using the equilibrium mixed model: (a) the corrected results, and (b) the original version. The dashed lines represent the Gaussian-filtered DNS and the Kolmogorov spectrum. This figure corresponds to Fig. 5(b) in the original paper.

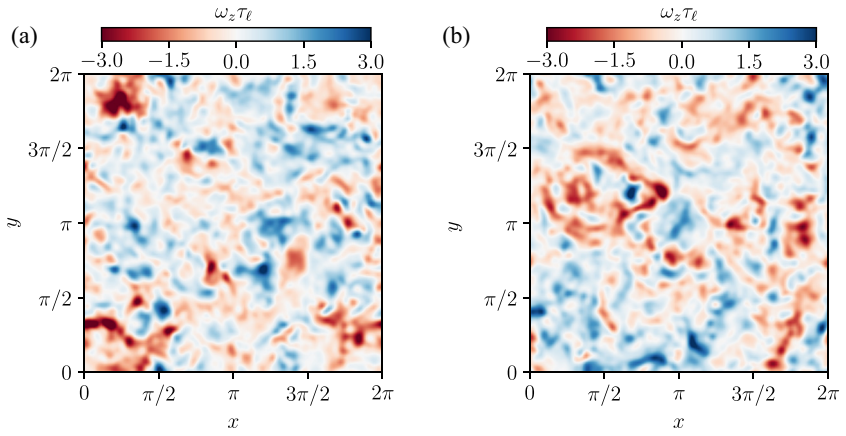

FIG. 4. The z component of vorticity along xy plane in the HIT simulation for the equilibrium mixed model with $\ell = 24\eta$ at $\kappa_{\max}\ell = 3.0$: (a) the corrected results, and (b) the original version. The particularities small-scale turbulence structures in this specific snapshots are not identical due to the randomness of turbulence. This figure corresponds to Fig. 8(b) in the original paper.

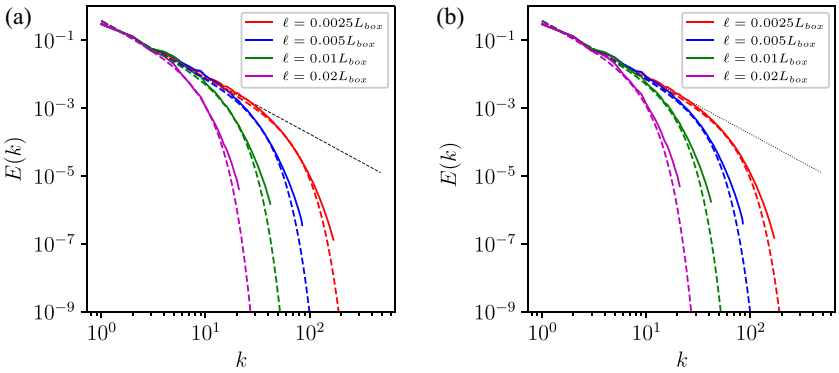

FIG. 5. Infinite Reynolds number energy spectra for *a posteriori* testing at $\kappa_{\max}\ell = 3.0$ using the equilibrium mixed model: (a) the corrected results, and (b) the original version. Thedashed lines represent the Gaussian-filtered DNS and the Kolmogorov spectrum. This figure corresponds to Fig. 9(b) in the original paper.