

# Erratum: “Invariants of the velocity-gradient, rate-of-strain, and rate-of-rotation tensors across the turbulent/nonturbulent interface in jets” [Phys. Fluids 20, 055101 (2008)]

Cite as: Phys. Fluids 21, 019902 (2009); <https://doi.org/10.1063/1.3059631>

Submitted: 17 November 2008 • Accepted: 26 November 2008 • Published Online: 21 January 2009

Carlos B. da Silva and José C. F. Pereira



View Online



Export Citation

## ARTICLES YOU MAY BE INTERESTED IN

[Invariants of the velocity-gradient, rate-of-strain, and rate-of-rotation tensors across the turbulent/nonturbulent interface in jets](#)

Physics of Fluids 20, 055101 (2008); <https://doi.org/10.1063/1.2912513>

[A general classification of three-dimensional flow fields](#)

Physics of Fluids A: Fluid Dynamics 2, 765 (1990); <https://doi.org/10.1063/1.857730>

[Dynamics of the velocity gradient tensor invariants in isotropic turbulence](#)

Physics of Fluids 10, 2336 (1998); <https://doi.org/10.1063/1.869752>

APL Machine Learning

Open, quality research for the networking communities

**Now Open for Submissions**

LEARN MORE



# Erratum: “Invariants of the velocity-gradient, rate-of-strain, and rate-of-rotation tensors across the turbulent/nonturbulent interface in jets” [Phys. Fluids 20, 055101 (2008)]

Carlos B. da Silva<sup>a)</sup> and José C. F. Pereira  
*Instituto Superior Técnico, Pav. Mecânica I, 1º andar/esq./LASEF, Av. Rovisco Pais, 1049-001 Lisboa, Portugal*

(Received 17 November 2008; accepted 26 November 2008; published online 21 January 2009)

[DOI: 10.1063/1.3059631]

There is an error in our article<sup>1</sup> concerning the scales used to plot the conditional statistics in relation to the turbulent/nonturbulent (T/NT) interface. Specifically, the values on the  $y_I/\eta$  axis which are shown in Figs. 8, 10, 15, 18, and 20 are not correct. The error arose during the postprocessing of the results, when converting the units from the original coordinate system used for the conditional statistics (originally  $y_I/H$ , where  $H$  is the inlet slot width of the jet) into Kolmogorov units, i.e.,  $y_I/\eta$ . The correct values can be obtained by multiplying the original coordinates  $y_I/\eta$  by the factor of “7.53.” This error affected the exact distance from the T/NT interface, where the physical processes discussed in the article take place. For instance, the teardrop shape in the  $(R, Q)$  joint probability density function exists at  $y_I/\eta \sim 12.8$  and not at  $y_I/\eta \sim 1.7$  as stated in the article.

Table I shows the correspondence between the original (wrong) and the correct values of all the particular locations used throughout the text of the article, e.g., the location of  $y_I/\eta = 1.7$  often used in the article in fact corresponds to  $y_I/\eta = 12.8$ . All the corrected figures, Figs. 8, 10, 15, 18, and 20, are given below (see Figs. 1–5). Notice that the error concerns only the values on the  $y_I/\eta$  axis of these figures, i.e., all the other magnitudes and the shapes of the functions are correct.

It is interesting to note that in the present simulation and deep inside the turbulent region, the Taylor microscale is equal to roughly 20 Kolmogorov microscales, i.e.,  $\lambda \sim 20\eta$ . Therefore, the thickness of the vorticity jump at the T/NT interface is close to one Taylor microscale and not to two Kolmogorov scales, as in the original figures. The new value agrees very well with that of Westerweel *et al.*<sup>2</sup>

Finally, it is important to stress that this error concerns only a change in coordinates made during the postprocessing of the results and that it does not in any way affect any of the results discussed in the article and least of all the direct numerical simulation which was thoroughly assessed and validated.

TABLE I. Conversion table between the original (wrong) and the correct values in relation to the T/NT interface of all the locations used throughout the article. The correction/conversion factor is 7.53.

Symbol	○	□	◇							
Wrong $y_I/\eta$	0.0	0.5	1.7	2.5	5.0	6.0	7.0	8.0	8.6	10.0
Correct $y_I/\eta$	0.0	3.7	12.8	18.8	37.6	45.2	52.7	60.2	64.7	75.3

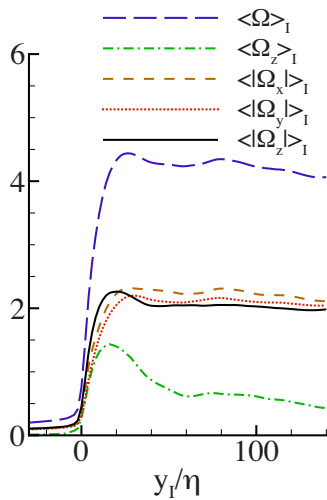


FIG. 1. (Color online) Corrected Fig. 8 from Ref. 1.

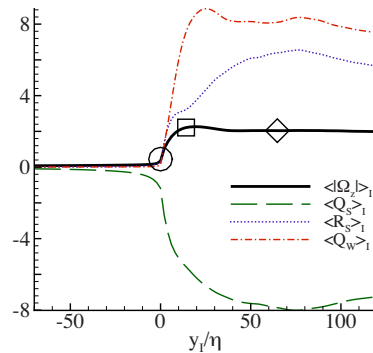


FIG. 2. (Color online) Corrected Fig. 10 from Ref. 1.

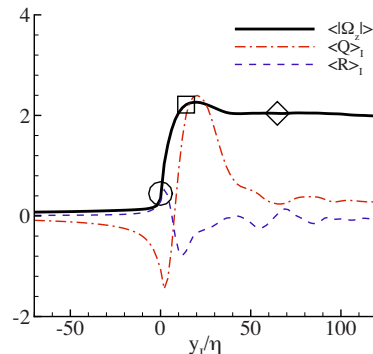


FIG. 3. (Color online) Corrected Fig. 15 from Ref. 1.

<sup>a)</sup>Electronic mail: carlos.silva@ist.utl.pt.

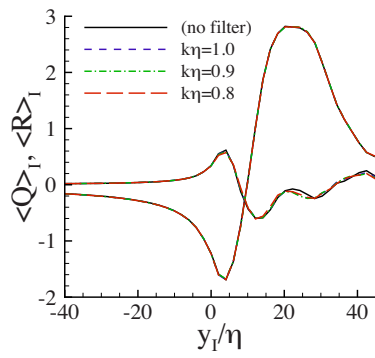


FIG. 4. (Color online) Corrected Fig. 18 from Ref. 1.

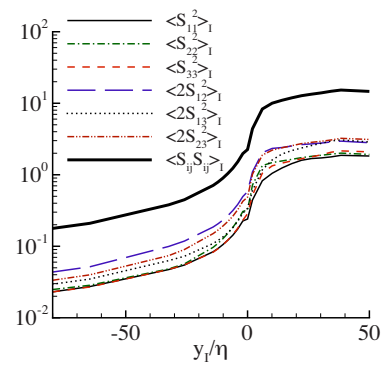


FIG. 5. (Color online) Corrected Fig. 20 from Ref. 1.

<sup>1</sup>C. B. da Silva and J. C. F. Pereira, "Invariants of the velocity-gradient, rate-of-strain, and rate-of-rotation tensors across the turbulent/nonturbulent interface in jets," *Phys. Fluids* **20**, 055101 (2008).

<sup>2</sup>J. Westerweel, C. Fukushima, J. M. Pedersen, and J. C. R. Hunt, "Mechanics of the turbulent-nonturbulent interface of a jet," *Phys. Rev. Lett.* **95**, 174501 (2005).