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ERRATUM

Improvement of mass source/sink for an immersed boundary method

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The above article (DOI: 10.1002/fld.1367) was published online on 25 October 2006 in Wiley InterScience (www.interscience.wiley.com). The following errors were subsequently identified:

Figures 8 and 9 in the article should be replaced with the figures below.

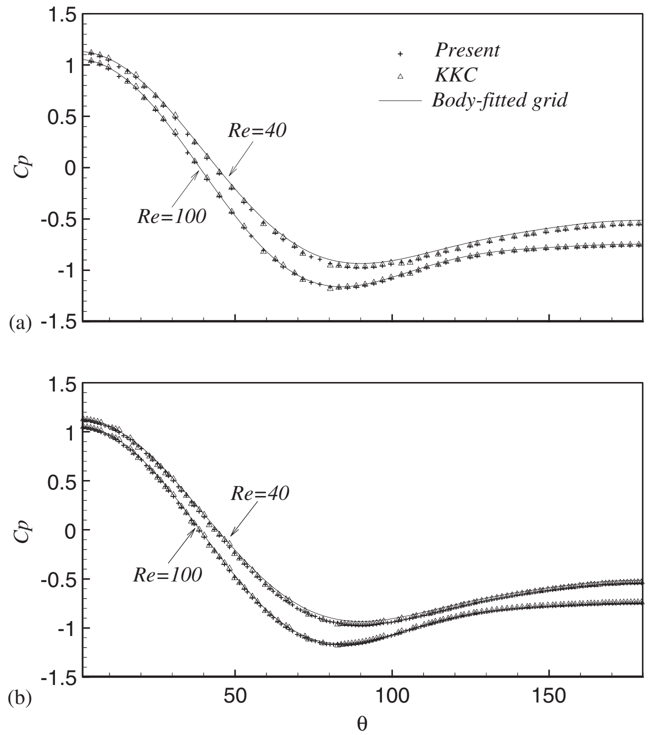

Figure 8. Pressure coefficient along the cylinder surface obtained using: (a) the grid system $G1$ and (b) the grid system $G2$.

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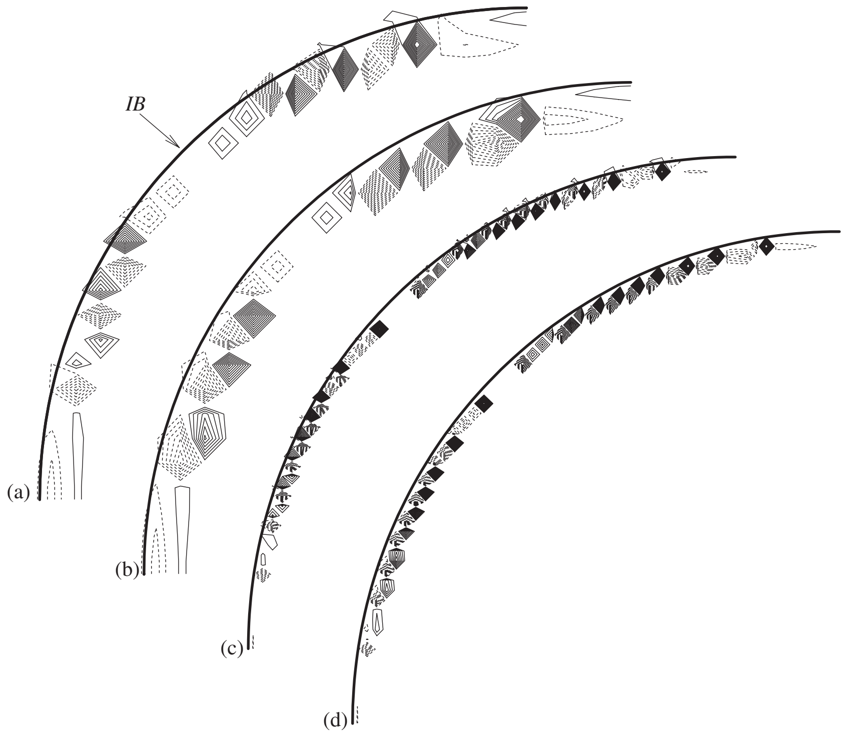

Figure 9. Contour of the mass source/sink near the IB within $0 \leq \theta \leq 90°$ at $Re = 40$ obtained by (a, c) the KKC method and (b, d) the present method with (a, b) the grid system $G1$ and (c, d) the grid system $G2$. Solid lines represent positive values ranged from 1 to 12 with increment 1 and dashed lines represent negative values ranged from -1 to -12 with increment -1.

The final paragraph in Section 4.2 should read:

The pressure coefficient along the cylinder surface at $Re = 40$ and 100 is shown in Figure 8 for both the coarse grid system $G1$ (Figure 8(a)) and the fine grid system $G2$ (Figure 8(b)). The results obtained with the body-fitted grid [17] are also shown for comparison. The pressure at the cylinder surface is obtained from the pressure at the cell centre (in the fluid region) nearest to the IB by assuming that the wall-normal derivation of pressure at the surface is zero. However, the mass source/sink term may be applied outside of the IB due to the staggered grid system, and the pressure defined at those points is non-physical. When using the KKC method, the non-physical points have an influence on the smoothness of the pressure coefficient obtained by the above post-processing method. The non-physical points are not included in Figure 8. By using the present method, however, a smooth curve of the pressure coefficient is obtained without any special treatment. Figure 9 shows the mass source/sink near the IB at $Re = 40$ for both grid systems $G1$ and $G2$. Using the KKC method as shown in Figure 9(a) and (c), the mass source/sink is distributed across the IB. For better physical understanding, the mass source/sink term should be restrained inside the IB. This situation is improved by the present method, see Figure 9(b) and (d). The magnitude of the mass source/sink term distributed outside of the IB is reduced efficiently.

In ‘Section 5. Conclusions’ the final sentence should read:

By applying the proposed method to two flow problems (the decaying vortex problem and uniform flow past a circular cylinder), the results indicate that the present method reduces the error of the numerical solution significantly; specifically, the boundary conditions at the IB are better enforced and the mass source/sink term is better to be restrained inside the IB.

The print publication will incorporate the amendments identified by this erratum note.