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CORRECTION

AN INVARIANCE PRINCIPLE FOR DIFFUSION IN TURBULENCE

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The use of the Poincaré inequality in (44), page 768, is in error. Instead, we should have used the Poincaré–Wirtinger inequality; see [1]. The estimation of the first term on the right-hand side of (42), page 768, thus needs to be reworked.

By the Poincaré–Wirtinger inequality and the fact that $|u_{k,\varepsilon}| \le |y_{k,\varepsilon}| + 1$ we have, for a certain positive constant c,

$$\begin{aligned}\iint_{\Omega_{2T,2R}} |u_{k,\varepsilon}\phi_t|\,dx\,dt &\le \iint_{\Omega_{2T,2R}} |y_{k,\varepsilon}|\,dx\,dt + |\Omega_{2T,2R}| \\ &\le \int_0^{2T}\left|\int_{B_{2R}} y_{k,\varepsilon}(t,x)\,dx\right|dt \\ &\quad + c\iint_{\Omega_{2T,2R}} |(\nabla y_k)(t/\varepsilon^2, x/\varepsilon)|\,dx\,dt + |\Omega_{2T,2R}|.\end{aligned}\tag{E1}$$

Since

$$\partial_t y_{k,\varepsilon}(t,x) = \sum_{i,j=1}^d \partial_{x_i}\big(a_{i,j,\varepsilon}(t,x)\partial_{x_j} y_{k,\varepsilon}(t,x)\big)$$

we have

$$\begin{aligned}\left|\int_{B_{2R}} y_{k,\varepsilon}(t,x)\,dx\right| &\le \left|\int_{B_{2R}} y^0_{k,\varepsilon}(x)\,dx\right| \\ &\quad + \sum_{i,j=1}^d \int_0^t \int_{\partial B_{2R}} |a_{i,j,\varepsilon}(s,x)||\partial_{x_j} y_{k,\varepsilon}(s,x)|\,ds\,S(dx).\end{aligned}\tag{E2}$$

Integrating both ends of (E1) over R from R_0 to $2R_0$ and using (E2) we obtain

$$\begin{aligned}R_0 &\iint_{\Omega_{2T,2R_0}} |u_{k,\varepsilon}\phi_t|\,dx\,dt \\ &\le \int_{R_0}^{2R_0} dR \iint_{\Omega_{2T,2R}} |u_{k,\varepsilon}\phi_t|\,dx\,dt \\ &\le 2T\int_{R_0}^{2R_0} dR\left|\int_{B_{2R}} y^0_{k,\varepsilon}(x)\,dx\right|\end{aligned}$$

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