MR961557 (90c:35190) 35Q99

Mu, Mu (PRC-ASBJ-AP)

Necessary and sufficient conditions for existence of global classical solutions of two-dimensional Euler equations in time-dependent domain.

Kexue Tongbao (English Ed.) **33** (1988), *no. 15,* 1295–1299.

Euler equations contain Coriolis' force. The time-dependent domain $\Omega(t)$ is bounded simply connected; $\Omega(t) = \{(x_1, x_2, t): \gamma(x_1, x_2, t) < 0\}$, where $t \geq 0$, $\gamma \in C^\infty(\mathbf{R}^2 \times \overline{\mathbf{R}}_+)$; the line element of $\partial\Omega(t)$ is dl_t. Using a paper he published in Chinese [Acta Math. Sci. (Chinese) **6** (1986), 201–218; per bibl.], the author proves the equivalence of the following three assertions: existence of a global classical solution; $\int_{\partial\Omega(t)}[(\partial\gamma/\partial t)/|\nabla_x\gamma|]dl_t = 0$ for all $t > 0$; existence of a measure-preserving mapping $\overline{\Omega}(0) \mapsto \overline{\Omega}(t)$ varying smoothly with t. A paper by H. Kozono [J. Differential Equations **57** (1985), no. 2, 275–302; MR0788281 (86i:35120)] is discussed.

Reviewed by *Jean Leray*