

**Tsai, Tai-Peng**

**On Leray's self-similar solutions of the Navier-Stokes equations satisfying local energy estimates.** (English) [Zbl 0916.35084](#)

*Arch. Ration. Mech. Anal.* **143**, No. 1, 29-51 (1998); erratum *ibid.* 147, 363 (1999).

The author considers self-similar solutions of the Navier-Stokes equations

$$u_t - \nu \Delta u + u \nabla u + \nabla p = 0, \quad \operatorname{div} u = 0 \quad \text{in } \mathbb{R}^3 \times (t_1, t_2)$$

having the form  $u(x, t) = \lambda(t) \cdot U(\lambda(t)x)$ ,  $p(x, t) = \lambda^2(t) \cdot P(\lambda(t)x)$ , where  $\lambda(t) = 1/\sqrt{2a(T-t)}$  and  $a > 0$ ,  $T > 0$ . The main theorem states that any weak self-similar solution which satisfies local energy estimates in the cylinder  $B_1(0) \times (T-1, T)$ , is identically zero.

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**MSC:**

[35Q30](#) Navier-Stokes equations

[76D05](#) Navier-Stokes equations for incompressible viscous fluids

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