

On the stability of plane Couette flows

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We consider the plane Couette flow $v_0 = (x_n, 0, \dots, 0)$ in the infinite layer domain $\Omega = \mathbf{R}^{n-1} \times (-1, 1)$, where $n \geq 2$ is an integer. The exponential stability of v_0 in L^n is shown under the condition that the initial perturbation is periodic in (x_1, \dots, x_{n-1}) and sufficiently small in the L^n -norm. Our result relies crucially on a classical result due to Romanov (1973) and Solopenko (1989). We also make use of several results from semigroup theory, in particular, analytic semigroups, perturbation results and $L^q - L^r$ estimates. ¹

¹Joint work with Horst Heck (Bern University of Applied Sciences, Switzerland) and Hideo Kozono (Waseda University)