

Remark on "A Solution of the Stokes' Problem for a Circular Cylinder"

M. Konstantinov

In the above paper¹ the author pretends to solve (in a form of series) the Stokes' problem for a circular cylinder. This problem has no solution (mathematical proofs and physical explanations of this phenomenon are available in textbooks) and this is known in the literature as the Stokes' paradox. Of course, the latter term is not precise: there is no paradox since there are not infinite cylinders in real world.

In any case one may expect that the proposed solution¹ is wrong from either mathematical or physical point of view. In fact, both things take place.

Consider the solution for the pressure p as a function of the polar coordinates θ , r as given on p. 64 (rows 4 and 6). It is easily verified that:

1. The function p is not differentiable in θ on the line $\theta=0$ and hence it cannot be a classical solution of equation (1), p. 56.

2. The function p has a local minimum in θ for $\theta=0$ while it should obviously have a global maximum in θ on this line. Moreover, we see that p takes the same constant value for $\theta=0$ and $\theta=\pi/2$.

Received 1. 10. 1987

¹Shulev, K. A solution of the Stokes' problem for a circular cylinder. — Theoretical & Appl. Mech., 18 (1986), No 2, 56-63.