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Victor L Shapiro* (shapiro@math.ucr.edu), Math Department, University of California,
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Using harmonic analysis, the initial value problem for the nonhomogeneous, nonstationary Stokes equations subject to periodic boundary conditions is solved in a generalized sense. This set of equations is (1) in Chapter 4 of Ladyzhenskia's famous book on viscous incompressible flow. The solution provided here involves new one-sided nonlinear conditions on the external force components of $f(x,t,s)$ along the lines of Brezis and Nirenberg for the heat equation. The result when specialized to the heat equation improves on the Brezis-Nirenberg result. The techniques used here are completely different from the ones they use. (Received February 07, 2008)