

**Dimitropoulos, Costas D.; Sureshkumar, R.; Beris, Antony N.**

**Direct numerical simulation of viscoelastic turbulent channel flow exhibiting drag reduction: Effect of the variation of rheological parameters.** (English) Zbl 0960.76057

*J. Non-Newtonian Fluid Mech.* 79, No. 2-3, 433-468 (1998).

From the summary: We present results from direct numerical simulations of fully turbulent channel flow of a polymer solution. Using constitutive equations derived from kinetic and network theories, in particular the FENE-P and the Giesekus models, we predict drag reduction for a variety of rheological parameters. The simulation algorithm is based on a semi-implicit time-splitting technique which uses spectral approximations in the spatial domain. The computations were carried out on a CRAY T3E-900 parallel supercomputer, under fully turbulent conditions.

**MSC:**

**76M20** Finite difference methods applied to problems in fluid mechanics

**76M22** Spectral methods applied to problems in fluid mechanics

**76A10** Viscoelastic fluids

**82D60** Statistical mechanics of polymers

**76F65** Direct numerical and large eddy simulation of turbulence

Cited in **37** Documents

**Keywords:**

dilute polymer solution; concentrated polymer solution; viscoelastic flow; direct numerical simulation; FENE-P model; Giesekus model; turbulent channel flow; drag reduction; semi-implicit time-splitting technique; CRAY T3E-900 parallel supercomputer

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