Abstract Submitted
for the DFD16 Meeting of
The American Physical Society

Large-eddy simulations of viscoelastic isotropic turbulence with the FENE-P fluid FERNANDO T. PINHO, Faculdade de Engenharia da Universidade do Porto (FEUP), PEDRO O. FERREIRA, CARLOS B. DA SILVA, Inst Superior Tecnico (IST), IDMEC/FEUP COLLABORATION — A new subgrid-scale (SGS) model developed for large-eddy simulations (LES) of dilute polymer solutions described by the Finitely Extensible Nonlinear Elastic constitutive equation closed with the Peterlin approximation (FENE-P), is presented. The filtered conformation tensor evolution equation uses the *self-similarity* of the polymer stretching terms, and the *global equilibrium* of the trace of the conformation tensor, while the SGS stresses are modelled with the classical Smagorinsky model. The new closure is assessed in direct numerical simulations (DNS) of forced isotropic turbulence using classical *a-priori* tests, and in *a-posteriori* (LES) showing excellent agreement with all the exact (filtered DNS) results.

Carlos Bettencourt Da Silva
Inst Superior Tecnico (IST)

Date submitted: 25 Jul 2016 Electronic form version 1.4