Localized disturbances in channel flow of a viscoelastic fluid AK-
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linear growth of a localized disturbance in polymeric channel flow is investigated
using Direct Numerical Simulations. The polymeric stress is represented by the
FENE-P model. When the amplitude of the intial disturbance is sufficiently small,
the presence of the polymer reduces the linear amplification of the disturbance en-
ergy, and this stabilizing influence depends on the Weissenberg number, maximum
polymer extensibility and the ratio of the solvent viscosity to the total viscosity.
When the initial disturbance amplitude is increased, the same trend is identified in
the early linear phase. In the subsequent non-linear phase, the behaviour of the
Newtonian and polymeric flows are substantially different. In the Newtonian case,
non-linear growth is followed by an ultimate decay of the disturbance energy due
to viscosity. On the other hand, in the polymeric flow, the non-linear terms due to
the solvent contribution are reduced. However, a new energy growth mechanism is
present and leads to bypass transition.

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