Abstract Submitted
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Thermodynamic modeling of melt deformation.[1] J.P. IBAR, Universite de Pau, Pau 64013 France — In current tube models, the chain is the focus of interest; it is *the* statistical system. For entangled chains, part of the chain (of molecular weight Me) becomes the system. In the statistical model of this paper, systems are sets of conformers coherently interactive, where interactive coupling is defined with respect to 2 types of interaction between conformers, covalent or inter-molecular. The duality is described by a new statistics, a crossed-statistics, which calculates the conformational state of all conformers, not just whether they are cis, gauche or trans, but also whether they are either covalently or inter-molecularly bonded. Entanglements manifestation result from a disturbance of the crossed-statistics by the increase of the number of covalently bonded conformers resulting in thermodynamically stable dual phases. The deformation of a statistical system results from a change of the conformation population between the flexed and trans conformations in the direction of the imposed macroscopic field vector. Shear or elongational flow mechanisms differ for the amount played by diffusion in feeding the deformed systems with undeformed (or relaxed) conformers to minimize the total energy required to accommodate the macroscopic deformation. Strain, strain rate and temperature determine how many systems are deformed and to what extent.

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