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# Rheology calculations and linear polymer viscoelasticity

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We have developed a model based on internal potential energy of polymer melt and on the amount of molecular entanglements and disentanglements during shear. By this model we have found linear relations between molecular structure and properties such as viscosity, modulus and stress in time and different temperature scales.

**Physically** there is an exact relation within precision of measurements. The principle is based on the polydispersity of molecules.

**Mathematically** MWD is a derivative of viscosity function, so viscosity is an integral of MWD function on the contrary to the most attempts made earlier.

**Rheologically** the form of power law is used in the viscosity function, where also the time function in the form of relaxation times integrated from MWD is composed by viscosity relations.

The modulus G(t) has a simple formula structure in all cases, and it is based on the generated transient viscosity formula $\eta(\dot{\gamma},t)$. This is abstract of our research being published in [1],[2].

$$G(t) = \frac{\eta(\dot{\gamma},t)}{t+1s}$$