Abstract: This thesis has considered two models for generalized Newtonian fluids in the case of First and Second Stokes problem - the typical example of simple shear flow. First model is a standard example of power law model in some cases compatible with Carreau's model. In the second model we have obtained a new point of view - the implicit form of the model. This idea is more discussed in [7]. Results for both models have been carried out by perturbation method and consequently numerically in software Matlab. Furthermore the first model has been solved by finite element method and principles of a linearization-algorithm has been investigated.