

Quasistatic Nonlinear Viscoelasticity and Gradient Flows
by Yasemin Sengul

We consider the equation of nonlinear viscoelasticity of strain-rate type in one space dimension. We prove existence and uniqueness of solutions for the quasistatic version of the problem using approximating sequences corresponding to the case when initial data takes finitely many values. This special case also provides upper and lower bounds for the solutions which are interesting in their own rights. We also show equivalence of the existence theory we develop with that of gradient flows when the stored-energy function is assumed to be λ -convex. Finally, asymptotic behaviour of solutions as time goes to infinity is investigated and stabilization results are obtained by means of a new argument.