962-74-1036 **Hyeona Lim*** (lim@math.msu.edu), Department of Mathematics, Michigan State University, East Lansing, MI 48824. *Transition Layer Dynamics of Viscoelastic System using the Time Discretization Method.* Preliminary report.

We investigate how evolution occurs as the strain $D(u)$ of viscoelastic system $u_{tt} = Div(\sigma(Du)+Du_t)-u$ goes towards the equilibrium state. The system can be physically described as an elastic bar with a nonconvex double-well energy density and a viscous stress placed on a rigid elastic foundation. The time limit of $D(u)$ eventually experiences a finite number of discontinuities if the strain starts from the continuous initial data whose phase transition layers are steep enough and the initial energy is sufficiently small. The number of transition layers is conserved and the zeros of Du depend continuously on t. We first discuss the one-dimensional case of the problem by discretizing each small time interval of the solution, which is called the implicit time discretization method, and using the Andrews-Pego transformed equations. Numerical observations on this phenomenon are also conducted and the result is extended to the two-dimensional system. (Received October 03, 2000)