1097-35-529 **Mohammad Rammaha*** (mrammaha1@unl.edu), **Yanqiu Guo**, **Sawanya Sakuntasathien**, **Edriss Titi** and **Daniel Toundykov**. *Hadamard well-posedness for a hyperbolic equation of viscoelasticity with supercritical sources and damping.*

Let $\Omega \subset \mathbb{R}^3$ be a smooth bounded domain. We consider the following model of viscoelasticity:

$$\begin{cases} u_{tt} - k(0)\Delta u - \int_0^\infty k'(s)\Delta u(x,t-s)ds + g(u_t) = f(u), \quad \text{in } \Omega \times (0,\infty), \\ u(x,t) = 0, \quad \text{on } \Gamma \times \mathbb{R}, \\ u(x,t) = u_0(x,t), \quad \text{in } \Omega \times (-\infty, 0], \end{cases}$$

where u denotes a scalar component of the elastic deformation vector, g is a monotone feedback, and $f(u)$ is a source. The relaxation function $k(s)$ satisfies the typical conditions: $k(0), k(\infty) > 0$ and $k'(s) \leq 0$ for all $s > 0$. The memory term $\int_0^\infty k'(s)\Delta u(x,t-s)ds$ quantifies the viscous resistance and provides a weak form of energy dissipation. It also emphasizes the full past history as time goes to $-\infty$, as opposed to the finite-memory model where the history is taken only over the interval $[0,t]$.

We employ the theory of monotone operators and nonlinear semigroups, combined with energy methods to establish the existence of a unique local weak solution. In addition, it is shown that the solution depends continuously on the initial data, and is global provided the damping dominates the source in appropriate sense. (Received January 29, 2014)