1137-35-246 **Dwight Holland*** (holladwi@oregonstate.edu), Corvallis, OR 97330, and **Ralph Showalter**.
Poro-Visco-Elastic Compaction.

The porosity of a visco-elastic medium satisfies a nonlinear pseudo-parabolic partial differential equation of the form

$$u' + A(u)\left(\alpha(u) + \eta u'\right) = G(t,u)$$

in which u' denotes the time derivative, $A(v) = -\nabla \cdot \kappa(v)\nabla$ is a linear second order elliptic operator in divergence form with coefficient depending on a function $v(x)$, $G(t,u)$ is a linear first order operator in u, and $\eta > 0$. The third order nonlinear term $A(u)u'$ distinguishes this equation from the classical porous medium equation. The solvability of an elliptic boundary-value problem for $(I + \eta A(v))\, u = f$ for $\eta > 0$ and the continuous dependence of the solution u on the function v is used to establish existence of the solution of the initial-boundary-value problem for the pseudo-parabolic equation. We give conditions under which the solutions are physically valid, and discuss numerical approximations for this problem. (Received February 05, 2018)