

Meeting: 1000, Albuquerque, New Mexico, SS 11A, Special Session on Nonlinear Partial Differential Equations Applied to Materials Science

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Mathematical problems of gel swelling.

We propose to analyze a model of gel swelling based on the continuum theory of mixtures. The governing equations consist of balance laws of mass, momentum and energy subject to constraints. The solid component is assumed to be viscoelastic. The porous effects of the polymer network are taken into account by the inclusion of diffusion into the model. The resulting system is of mixed hyperbolic-parabolic type with free boundaries. Analytic as well as numerical simulations are presented. (Received August 25, 2004)