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Robert J Ronkese* (bob.ronkese@usma.edu), Dept . of Mathematical Sciences, United States Military Academy., West Point, NY 10996. *The Analysis of a Nonlinear Adaptive Elastic Plate Under Loading with Numerical Simulations of Its Displacement and Growth Under Various Boundary Conditions.*

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The plate and the rod are two geometric solids that can be used to model the trabeculae of bone. TRABUCHO and VIAÑO in 1996 and FIGUEIREDO and TRABUCHO in 2004 have used the adaptive elastic rod to model the deposition and reabsorption (remodeling) of trabecular bone. In their models, the stress-strain relationship and a remodeling rate equation are both linear in terms of the strain tensor. Recently, GILBERT and RONKESE have extended this to formulate a model that includes the adaptive elastic plate in which the remodeling rate equation is quadratic with respect to the strain tensor. Numerical simulations of the displacement of this plate under loading as well as simulations of bone growth according to the remodeling rate equation will be shown for two original sets of boundary conditions and for intermediate cases, too. Background analysis of the model will be given beforehand as well. (Received August 29, 2008)