1057-74-140 **Robert J Ronkese*** (bob.ronkese@usma.edu), Dept of Mathematical Sciences, United States Military Academy, West Point, NY 10996. *An Asymptotic Model of a Nonlinear Adaptive Orthotropic Elastic Rod.* Preliminary report.

Cancellous bone can be viewed as a lattice of asymptotically thin rods and plates. It is assumed that cancellous bone has at least orthotropic symmetries and the planes of orthotropic symmetry coincide with the fabric tensor. VAN RIETBERGEN et al. found that errors in the stress-strain calculation when using the orthotropic stiffness matrix instead of the full matrix amounts to a few percent or less. COWAN and YANG used a spectral decomposition method to find the average eigenbasis of stiffness matrices. They found that a set of human cancellous bone specimens had orthotropic symmetry at a 95% confidence level.

Considering the above, a model of the orthotropic elastic rod will be presented. Scalings will transform the stress and strain tensors in the original domain into their scaled counterparts in an enlarged domain. Simplifications will be made in the asymptotic expansions of the tensors and the displacement vector. The results will be used in an ODE governing the rate of bone growth and reabsorption. (Received January 19, 2010)