1046-35-1828 **Ana Vasilic*** (vasilic@math.udel.edu), University of Delaware, Dept. of Mathematical Sciences, 213 Ewing Hall, Newark, DE 19716, and **Ming Fang** and **Robert P. Gilbert**.

Homogenization of Time-Harmonic Acoustics of Bone: The Diphasic Case.

Osteoporosis can be described as a decrease in strength of bone. One of the non-invasive screening techniques for osteoporosis is ultrasound. Although this method has been used to characterize the acoustic properties of bone for some time, there is still a need for better mathematical models which would lead to improved interpretation of ultrasound tests. We present a mathematical model of time-harmonic acoustics of cancellous bone. Bone is modeled as a porous medium with periodic arrangement of pores of characteristic size ε. The solid part (the bone matrix) is assumed to be elastic and the pores contain a slightly compressible viscous fluid (representing blood-marrow mixture). We consider the effective diphasic behavior corresponding to the case when fluid and solid move out-of-phase. To obtain the effective equations (describing homogenized behavior of the medium) we employ the two-scale convergence method. For sufficiently small frequency of time-harmonic waves, we prove that there exist unique solution to the homogenized two-scale system. Moreover, after introducing several auxiliary problems on the unit cell, we eliminate the fast variable from the equations for the displacement. (Received September 16, 2008)