Advanced rock mechanics

Semester 1, 2009

Homework #5 (30 March)

due by 5 April 2009

1. Show that $E=G(3\lambda+2G)/(\lambda+G)$, $\nu=\lambda/2/(\lambda+G)$, $E=9KG/(3K+G)$ and $\nu=(3K-2G)/(6K+2G)$. Definitions of each parameters were given during the class.

2. Assuming that a rock element is subjected to $\sigma_v = \sigma_H$ at a depth of 2400 m and erosion causes a removal of 1200 m of overburden over millions of years, determine the stress state at a depth of 1200m and ratio of horizontal to vertical stress after erosion. The density and Poisson's ratio of rock is 2600 kg/m^3 and 0.25, respectively. Note that the answer to this question is largely open and make your own assumptions, if necessary.