

ResGeo 202 Reservoir Geomechanics
Spring 2017, Stanford Online

Homework 4 – Estimating Limits on S_{Hmax}

Due May 9, 2017 (7:30 UTC)

Please direct any questions to the Piazza discussion forum on the course website.

Note that the deadline is in Coordinated Universal Time (UTC). If you want to see the current time in UTC, please google: “Current time in UTC.”

Background

In this assignment, you will be estimating the range of possible magnitudes of S_{Hmax} , the maximum horizontal principal stress, based on knowledge of the vertical stress, S_V , the pore pressure, P_p , and the minimum horizontal principal stress, S_{hmin} .

Utilize the relationships for faults in frictional equilibrium (Unit 6, slide 29) to follow the steps below. Then, **answer the questions on the page below.**

Instructions

- a. **Which stress states are possible in each of the following cases at a depth of 8,000 ft?**

Case 1: $\mu = 0.71$, $S_V = 8000$ psi, $S_{hmin} = 4000$ psi;

Case 2: $\mu = 0.71$, $S_V = 8000$ psi, $S_{hmin} = 5500$ psi;

Case 3: $\mu = 0.71$, $S_V = 8000$ psi, $S_{hmin} = 7000$ psi;

Case 4: $\mu = 0.71$, $S_V = 8000$ psi, $S_{hmin} = 8000$ psi;

Determine which stress states are possible WITHOUT any knowledge of pore pressure. For each of the above cases, select which stress states are possible from the given choices. No knowledge of pore pressure is necessary to make these distinctions.

- b. **Compute the possible range of values of S_{Hmax} if $P_p = 2400$ psi.**

Use the faulting equilibrium equations to constrain S_{Hmax} . For each of the above cases, select the faulting equilibrium equation(s) that corresponds to the possible stress states to calculate and constrain the **minimum possible** and **maximum possible** values of S_{Hmax} to the nearest psi.

- c. **Answer the questions on the page below**

Use your answers to a. and b. to complete the questions on the page below. The answers will be posted after the due date. Numerical entry type responses have only a range of acceptable values and are graded electronically, so please adhere to the value of constants given here to prevent misgrading of your submissions.