

AEM 341 Problem Set #3

Due: 9th Feb 2018

1. Textbook 2.8
2. Given a stress state

$$\sigma = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix} \times 10^6 \text{ psi}$$

The material fails at 4×10^6 psi. Is the stress state safe?

3. Using the von Mises yield criteria, solve 1.13 again using ONLY information in the textbook.
4. The Titanic sank into the Atlantic Ocean at a depth of 12500 feet.
 - a. Determine the stress state of a block of steel sitting on the ocean floor at 12500 ft.
 - b. Using the von Mises yield criteria, determine if the ship's steel has yielded due to hydrostatic pressure.
 - c. Why does this matter for the preservation of sunken vehicles (including ships and aircraft)?