Last Updated: March 17, 2020 at 3:34pm

Name:

Homework 6

Due 2 Apr 2020

1. Plot the fatigue data given in hw6_data.txt and, using the data, find σ'_f and b.

2. Use the data and results from problem 1 to estimate the S-N curve for an identical specimen loaded with a mean stress of 30 ksi.

3. A part from the same material as problems 1 and 2 is subjected to variable loading, such that for every 20 fully reversed cycles of 50 ksi, there are 5 cycles of 60 ksi load with a mean stress of 30 ksi. Estimate the number of cycles to failure for this part.

4. The following state of constant amplitude fatigue stress is applied to an un-notched specimen of 2024-T4 aluminum (stress varies from 0 to value shown below).

$$\sigma_x = 27 \text{ ksi}$$
$$\sigma_y = 13 \text{ ksi}$$
$$\tau_{xy} = 8 \text{ ksi}$$

   Predict the number of cycles before failure.