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Name:

## Homework 6

Due 2 Apr 2019

1. Plot the fatigue data given in hw6\_data.txt and, using the data, find  $\sigma'_f$  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

$$\sigma_x = 27 \text{ ksi}$$

$$\sigma_y = 13 \text{ ksi}$$

$$\tau_{xy} = 8 \text{ ksi}$$

Predict the number of cycles before failure.