Reliability Analysis HW4

Problem 1

Exercise 8.22 Consider the diesel generator fan data in file Fan.csv.

(b) Fit the exponential distribution to the data. Make a Weibull plot with the ML estimate of $F(t)$ on it.

(c) Report the ML estimate and a 95% confidence interval for the fraction failing before 1250 hours of service, based on the exponential distribution.

(d) Report the ML estimate and a 95% confidence interval for the 0.10 quantile of the life distribution, based on the exponential distribution.

(e) Repeat parts (b) and (c) using the Weibull distribution. How do the results compare?

(f) Report the ML estimate and 95% confidence interval for the Weibull shape parameter. What do these results say about the use of an exponential distribution to describe the diesel generator fan data? How would the conclusion affect fan replacement policy?

Problem 2

Exercise 8.27 Use the bearing-cage fracture data in file Bearingcage.csv to do a Weibull analysis of the data.

(b) Obtain a contour plot of the relative likelihood of μ and σ. What does the shape of the contour plot suggest?

(c) Compute a Wald 95% confidence interval for $t_{0.10}$.

(d) Compute an LR-based 95% confidence interval for $t_{0.10}$.

(e) Which interval is more trustworthy? Why?

(f) Plot the estimated hazard function with pointwise CIs between 100 and 10000 hours.