MTBF and reliability determination when no failures are observed in a test

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\[ n = 80 \text{ units tested} \]
\[ r = 0 \text{ units failed} \]
\[ T = 2179 \text{ hrs. Life test duration} \]
\[ \alpha = 0.2 \text{ alpha} \]
\[ T_C = 85 \text{ Case temperature} \]

\[ \text{CL} (1-\alpha) = 0.8 \text{ Confidence level for MTBF} \]

\[ \chi^2_{\alpha, df} = 3.219 \text{ Critical value of the Chi-Squared distribution for } \alpha = 0.2 \text{ and df = 2} \]
\[ T_a = 174320 \text{ accumulated unit hours of operation} \]

\[ \text{MTBF}_{L1} = \frac{2T_a}{\chi^2_{\alpha, df}} = \frac{108311.1 \text{ hours (eq 7.29 pg 195)}}{} \]

Lower Confidence Limit for MTBF

Thus MTBF at 80% confidence is \((108311.1 \text{ hr} ; \infty)(12.36 \text{ yr}; \infty)\) and failure rate \(<= 9.232664\) failures per million hours.