Mission Reliability of NCCW System

$$R(T+t|T) = \frac{R(T+t)}{R(T)} \tag{1}$$

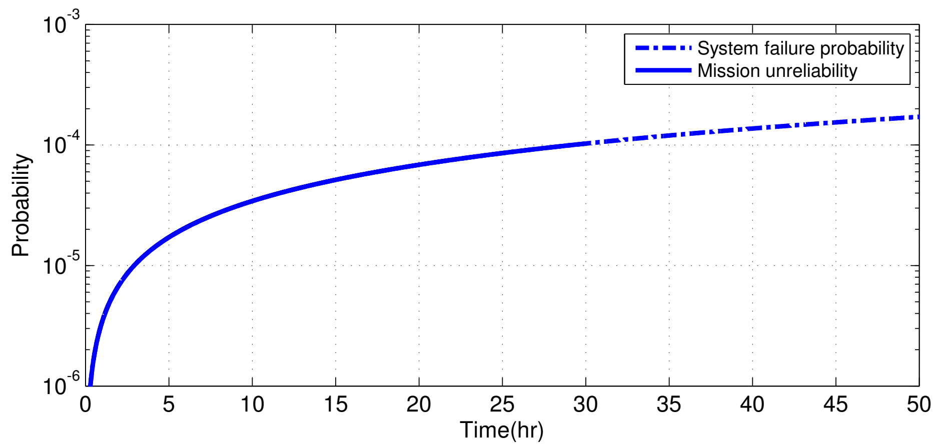

Figure 1: Mission unreliability of 30 more hrs given that the system survived for T=50 hrs[cov =1.0].

Figure 1 plots the probability that the NCCW system fails in the next 30 hrs given that it was reliable for the first 50 hrs. Owing to the memoryless property of the exponential distribution considered for the failure and repair time distributions of the components, it is observed that the mission unreliability of additional 30 hrs is the same as the system failure probability in the initial 30 hrs of system life time.

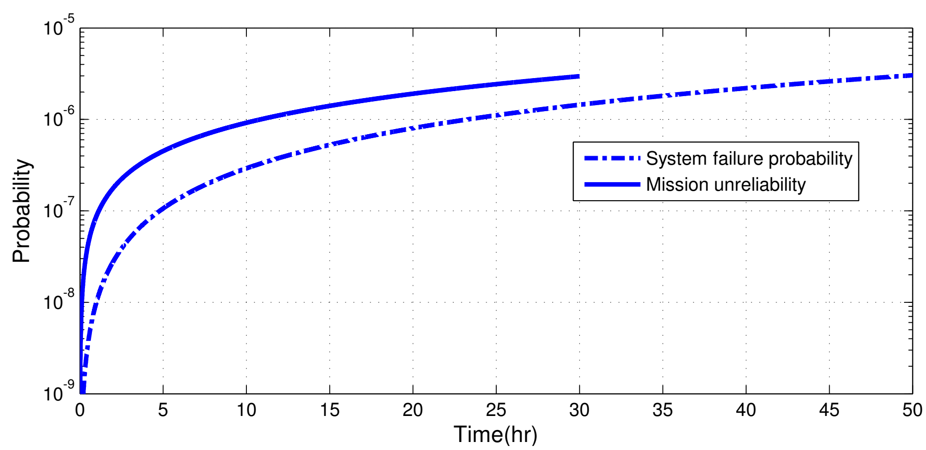

Figure 2: Mission unreliability of 30 more hours given that the system survived for T=50 hrs [cov=0.7].

Figure 2 plots the mission unreliability of the NCCW system assuming Weibull distribution for heat exchanger failure time and exponential distribution for the failure and repair time of the pump trains. It is observed that the mission unreliability of additional 30 hrs having survived 50 hrs is higher than system failure probability in the initial 30 hrs of system life time. At the end of 80 hrs, the mission unreliability is 2.9647 x 10^{-6} and the system failure probability is 3.0380 x 10^{-6}.

Truncated distributions

$$g(t) = \frac{f(t)}{F(b) - F(a)} \qquad 0 \leq a \leq t \leq b < \infty \tag{2}$$

$$G(t) = \frac{F(t) - F(a)}{F(b) - F(a)} \qquad 0 \leq a \leq t \leq b < \infty \tag{3}$$

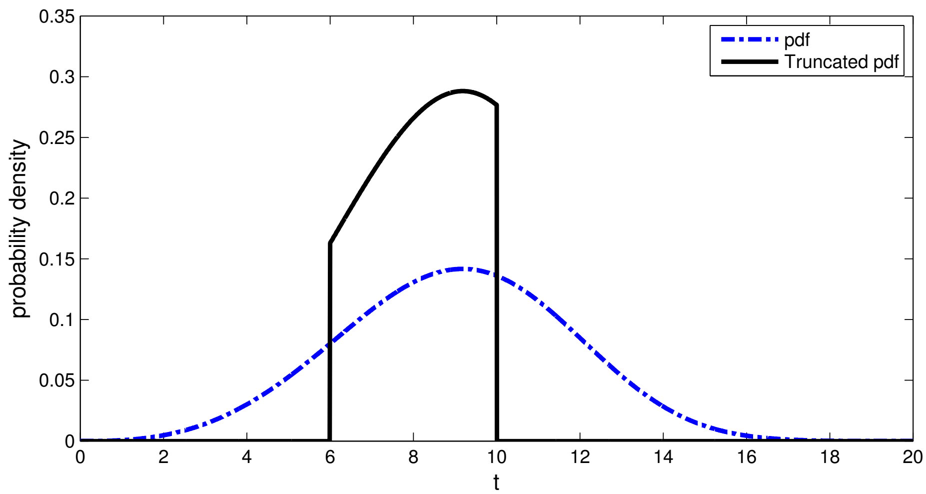

Figure 3: Weibull distribution with λ=0.1 and γ=3.7 truncated at $a = 6, b = 10$.

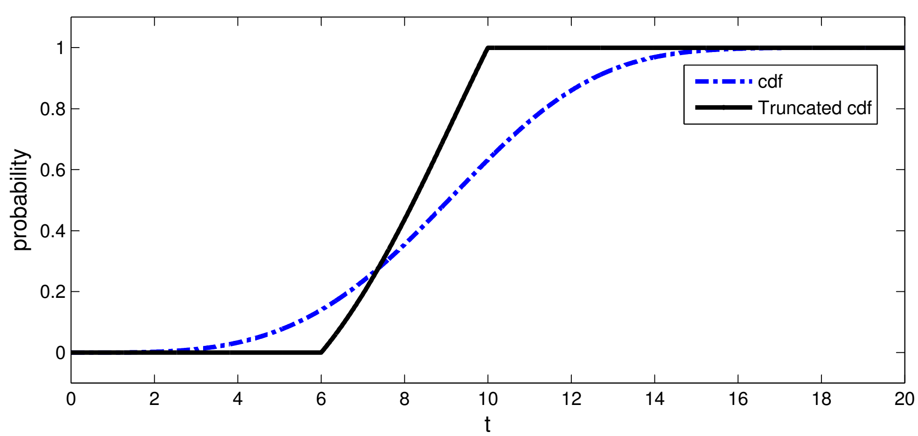

Figure 4: Weibull distribution with λ=0.1 and γ=3.7 truncated at $a = 6, b = 10$.