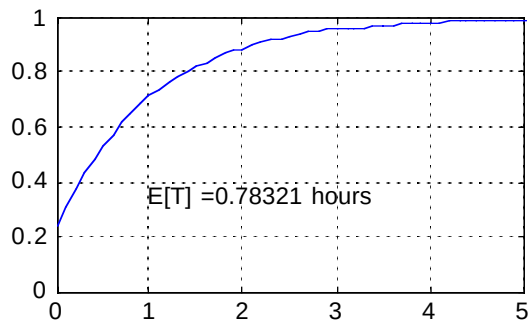
Search and Detection

λ–σ Acoustic Detection Model

1. Using the λ–σ model with SE_bar = -3.5dB; λ=4 jumps/hr; and σ=5 dB,
   a. compute and plot CDF $F_T(t)$ for t=0:.1:5 hours;
   b. compute mean time to detection as

$$E[T] = \int_{t=0}^{\infty} \left(1 - F_T(t)\right) dt \,.$$




Ans:

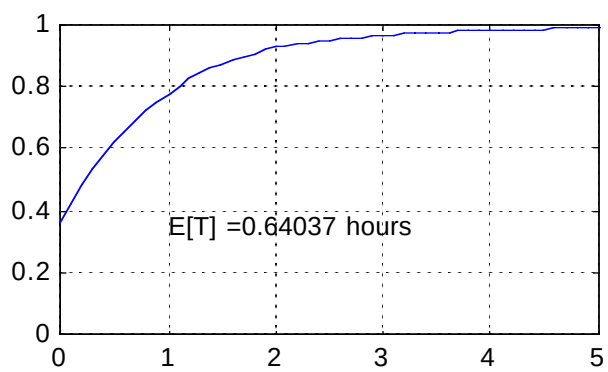
CDF =
1 - (1-Φ(-3.5/5)) exp(-4*Φ(-3.5/5)*t)

meanT = simrule(1-CDF,dt)

2. Using the λ–σ unimodal formula with λ=2 jumps/hr, σ=3 dB, and

$$\overline{SE}(t) = \begin{cases} \sin(t) - 1, t \in [0, 3\pi/2] \\ -2, t > 3\pi/2 \end{cases}$$

a. compute and plot $F_T(t)$ for t=0:.1:5 hours;
b. compute mean time to detect.

Note that

$$\overline{SE}^*(t) = \begin{cases} \sin(t) - 1, t \in [0, \pi/2] \\ 0, t > \pi/2 \end{cases}$$