STA-3001 : COMPUTER-INTENSIVE STATISTICS
ASSIGNMENT 3: APPROXIMATION AND
OPTIMIZATION

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1 :EM, MCEM, DA

a) The $L(\lambda|y) = L(\lambda|x, z)$
Since we assume all failure times of all individual light bulbs are independent

$$\begin{aligned} L(\lambda|y) &= L(\lambda|x) * L(\lambda|z) \\ &= \{\prod_{i=1}^{m} f_x(x|\lambda)\}\{\prod_{i=m+1}^{n} f_z(z|\lambda)\} \\ &= \{\prod_{i=i=m}^{m} \lambda^2 x_i e^{-x_i\lambda}\}\{\prod_{i=m+1}^{n} \lambda^2 z_i e^{-z_i\lambda}\} \end{aligned}$$

The complete log-likelihood

$$L(\lambda|y) = \prod_{i=1}^{n} x_i \prod_{i=m+1}^{n} z_i \left(\lambda^{2*n} e^{-\lambda(\sum_{i=1}^{m} x_i + \sum_{i=m+1}^{n} z_i)}\right)$$

$$l(\lambda|y) = \sum_{i=1}^{m} \ln(x_i) + \sum_{i=m+1}^{n} \ln(z_i) + 2n \ln\lambda - \lambda \sum_{i=1}^{m} x_i - \lambda \sum_{i=m+1}^{n} z_i$$

b)

c)

d)

e)

f)

g)

2:EM

a)

b)

c)

d)

e)

3:MCI, Reimann,Laplace

4:Simulated Annealing