Assignment

> ## 1) Keeping N(t) fix and simulate t (time)

>

> lambda=0.4

> # fixed count = n = N(t) = 10

> n=10

> # Generating a random sample from Uniform (0,1) distribution

> u1=runif(n,0,1)

> u1

[1] 0.7497003 0.2336203 0.3096164 0.8259884 0.1078147 0.7984386 0.9827599 0.9845895 0.7911768 0.8440459

> # we Know that, the interarrival time is exponentially distributed

> # Therefore, t ~ Exp(lambda)

> # F(t) = 1-e^(-lambda(t))

> # u1 = 1-e^(-lambda(t))

>

> # Solving the equation we get,

> # Simulating time t

> t=(-1/lambda)\*log(u1)

> t

[1] 0.72020439 3.63514565 2.93105275 0.47793631 5.56835337 0.56274312 0.04347618 0.03882614 0.58558445 0.42387096

> # Arrival times

> s=c(0,cumsum(t))

> s

[1] 0.0000000 0.7202044 4.3553500 7.2864028 7.7643391 13.3326925 13.8954356 13.9389118 13.9777379 14.5633224

[11] 14.9871933

> Nt= 0:10

>

> # Ploting the poission process for fixed N(t) and simulated time t

> plot(Nt,s,type='s')

> 

> ## 2) Keeping t (time) fix and simulate N(t) (ie No. of events occuring in time interval t)

>

> # Let the time interval be [0,b] for b=15

> lambda=0.4

> b=15

> m=round(3\*b\*lambda)

> # Generating a random sample from Uniform (0,1) distribution

> u2=runif(m,0,1)

> u2

[1] 0.9172889 0.1741954 0.8954781 0.5363685 0.3825905 0.9048105 0.4557369 0.5181675 0.8823264 0.5245453 0.9131489

[12] 0.8796188 0.2062793 0.3290204 0.2257715 0.7225967 0.2567001 0.9260994

> # we Know that, the interarrival time is exponentially distributed

> # Therefore, t ~ Exp(lambda)

> # F(t) = 1-e^(-lambda(t))

> # u2 = 1-e^(-lambda(t))

>

> # Solving the equation we get,

> # Simulating time t

> t=(-1/lambda)\*log(u2)

> t

[1] 0.2158321 4.3689433 0.2759937 1.5573348 2.4019750 0.2500744 1.9645990 1.6436418 0.3129831 1.6130587 0.2271408

[12] 0.3206667 3.9463103 2.7790891 3.7205802 0.8122602 3.3996169 0.1919342

> s=cumsum(t)

> s

[1] 0.2158321 4.5847755 4.8607692 6.4181040 8.8200790 9.0701533 11.0347524 12.6783941 12.9913772 14.6044359

[11] 14.8315767 15.1522435 19.0985537 21.8776428 25.5982229 26.4104831 29.8101000 30.0020341

> # Treaming the vector s upto the time t

> s=s[s<b]

> nstar = length(s)

> Nt=1:length(s)

> Nt

[1] 1 2 3 4 5 6 7 8 9 10 11

>

> # Ploting the poission process for fixed N(t) and simulated time t

> plot(c(0,Nt),c(0,s),type='s')

> 