***#The code below finds the exact G(s) for a compound poisson with gamma claim amounts***

***CompPoisson***<-function(s, poisson.lambda, gamma.shape, gamma.scale, max.length=1000)

{

S <- rep(0, max.length)

for(i in 1:max.length){

S[i]<-dpois(i,lambda= poisson.lambda)\*pgamma(s, shape=gamma.shape\*i, scale=gamma.scale)

}

G<-sum(S)+exp(-poisson.lambda)

round(G,4)

}

CompPoisson(s=5, 10,1,1)

***#The code below finds the exact G(s) for a compound poisson with gamma claim amounts and compares this with the Normal approximation and the Translated Gamma approximations to G(s)***

***CompareDist***<-function(s, poisson.lambda, gamma.shape, gamma.scale ,max.length=1000)

{

S <- rep(0, max.length)

for(i in 1:max.length){

S[i]<-dpois(i,lambda= poisson.lambda)\*pgamma(s, shape=gamma.shape\*i, scale=gamma.scale)

}

G<-sum(S)+exp(-poisson.lambda)

ES<- poisson.lambda\*gamma.shape\*gamma.scale

VarS<- poisson.lambda\*gamma.shape\*( gamma.shape+1)\*(gamma.scale^2)

RhoS<-(gamma.shape+2)/sqrt(poisson.lambda\*gamma.shape\*(gamma.shape+1))

alpha.g<-(2/RhoS)^2

theta.g<-sqrt(VarS/alpha.g)

k<-ES- alpha.g\*theta.g

Stand.s<-(s- ES)/sqrt(VarS)

Trans.gamma<-pgamma(s-k, shape=alpha.g, scale=theta.g)

round(c(G,pnorm(Stand.s), Trans.gamma),4)

}

CompareDist(5, 10,1,1)

CompareDist(10, 10,1,1)

CompareDist(15, 10,1,1)

CompareDist(20, 10,1,1)

CompareDist(5, 20,5,0.1)

CompareDist(10, 20,5,0.1)

CompareDist(15, 20,5,0.1)

CompareDist(20, 20,5,0.1)

***#The code below plots out the exact pdf of S***

***PlotCompPoisson***<-function(poisson.lambda, gamma.shape, gamma.scale, max.length=1000)

{

plot.length<- poisson.lambda\*gamma.shape\*gamma.scale\*3

G<-rep(0,(plot.length\*2))

S <- rep(0, max.length)

for (j in 1:(plot.length\*2))

{

for(i in 1:max.length){

S[i]<-dpois(i,lambda= poisson.lambda)\*pgamma(j\*0.5, shape=gamma.shape\*i, scale=gamma.scale)

}

G[j]<-sum(S)

}

for (j in 1:(plot.length\*2))

{

G[j]<-G[j+1]-G[j]

}

plot(G,type= "l",xlab="s", ylab="density")

}

PlotCompPoisson(10,1,1)

***#The code below adds the Normal pdf approximation to S***

***PlotNormalApprox***<-function(poisson.lambda, gamma.shape, gamma.scale)

{

plot.length<- poisson.lambda\*gamma.shape\*gamma.scale\*3

G<-rep(0,(plot.length\*2))

ES<- poisson.lambda\*gamma.shape\*gamma.scale

VarS<- poisson.lambda\*gamma.shape\*( gamma.shape+1)\*(gamma.scale^2)

for (j in 1:(plot.length\*2))

{

G[j]<-pnorm((j\*0.5 - ES)/sqrt(VarS))

}

for (j in 1:(plot.length\*2))

{

G[j]<-G[j+1]-G[j]

}

lines(G,col="red")

}

***#The code below adds the Translated gamma pdf approximation to S***

***PlotGammaApprox***<-function(poisson.lambda, gamma.shape, gamma.scale)

{

plot.length<- poisson.lambda\*gamma.shape\*gamma.scale\*3

G<-rep(0,(plot.length\*2))

ES<- poisson.lambda\*gamma.shape\*gamma.scale

VarS<- poisson.lambda\*gamma.shape\*( gamma.shape+1)\*(gamma.scale^2)

RhoS<-(gamma.shape+2)/sqrt(poisson.lambda\*gamma.shape\*(gamma.shape+1))

alpha.g<-(2/RhoS)^2

theta.g<-sqrt(VarS/alpha.g)

k<-ES- alpha.g\*theta.g

for (j in 1:(plot.length\*2))

{

G[j]<-pgamma(j\*0.5-k, shape=alpha.g, scale=theta.g)

}

for (j in 1:(plot.length\*2))

{

G[j]<-G[j+1]-G[j]

}

lines(G,col="blue")

}

PlotCompPoisson(10,1,1)

PlotNormalApprox(10,1,1)

PlotGammaApprox(10,1,1)

PlotCompPoisson(20,5,0.1)

PlotNormalApprox(20,5,0.1)

PlotGammaApprox(20,5,0.1)

PlotCompPoisson(1,50,1)

PlotCompPoisson(5,50,0.1)

PlotNormalApprox(5,50,0.1)

PlotGammaApprox(5,50,0.1)

CompareDist(50, 5,50,0.1)