theta\_0=c(0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9) n\_0=c(1,2,8,16,32)

param\_a=matrix(0L, nrow =length(theta\_0), ncol =length(n\_0)) param\_b=matrix(0L, nrow =length(theta\_0), ncol =length(n\_0))

for (i in 1:length(theta\_0))

{for (j in 1:length(n\_0))

{param\_a[i,j]=theta\_0[i]\*n\_0[j]

param\_b[i,j]=(1-theta\_0[i])\*n\_0[j]

}

}

Pr=matrix(0L, nrow =length(theta\_0), ncol =length(n\_0)) for (i in 1:length(theta\_0)) {for (j in 1:length(n\_0)) {

f <- function(x) {choose(100,57)\*(x^57)\*((1- x)^43)\*(gamma(param\_a[i,j]+param\_b[i,j])/(gamma(param\_a[i,j])\*gamma(param\_b[i,j])))\*(x^(param\_a[ i,j]-1))\*(1-x)^(param\_b[i,j]-1)}

bot=integrate(f,0, 1, rel.tol=1e-10)$value

top=integrate(f,0.5, 1, rel.tol=1e-10)$value

Pr[i,j]=top/bot

}

}

contour(theta\_0,n\_0,Pr,,xlab=expression(paste(theta)), ylab='n\_0')