

```

library(rpvm); library(snow);
pan=1000; each=10; set.seed(2548);
pdmabrd=seq(.01,.99,.02); nbrd=length(pdmabrd);
pdmamag=c(seq(.01,.97,.03),.99); nmag=length(pdmamag);
phi_brd=0.2; S_brd=1/phi_brd-1;
phi_mag=0.5; S_mag=1/phi_mag-1;
report=array(c(0,1,10,1,5,0,1,1,1,1,1,0,0,0,1),dim=c(5,3));
nrep=c("None","Bench","Fort","Faible","Selon");
rarete=0;
assort=array(c(1,1,0,1),dim=c(2,2));
level=seq(.025,.5,.025);

date();
cl<-makeCluster(2)
z=clusterApplyLB(cl,1:each,iterate)
iterate=function(i) {
  titles=array(0,dim=c(length(nrep),length(rarete),nbrd,nmag))
  pref_brd=rgamma(2*nbrd*pan,c(pdmabrd,1-pdmabrd)*S_brd)
  pref_brd=array(pref_brd,dim=c(nbrd,2,pan))
  pref_brd=pref_brd[,1,]/apply(pref_brd,c(1,3),sum)
  pref_brd=array(rep(pref_brd,nmag),dim=c(nbrd,pan,nmag))
  pref_brd=aperm(pref_brd,c(2,1,3))
  pref_mag=rgamma(2*nmag*pan,c(pdmamag,1-pdmamag)*S_mag)
  pref_mag=array(pref_mag,dim=c(nmag,2,pan))
  pref_mag=pref_mag[,1,]/apply(pref_mag,c(1,3),sum)
  pref_mag=array(rep(pref_mag,nbrd),dim=c(nmag,pan,nbrd))
  pref_mag=aperm(pref_mag,c(2,3,1))
  for (irar in 1:length(rarete)){
    ms_brd1=pref_brd*exp(rarete[irar]*(1-pref_mag))
    ass1=ms_brd1+1-pref_brd; ass2=(1-pref_brd)/ass1; ms_brd1=ms_brd1/ass1; rm(ass1);
    for (irep in 1:nrow(report)){
      if (report[irep,1]==0){
        reportcase=array(1,dim=c(pan,nbrd,nmag))
      }
      if (report[irep,1] !=0 & report[irep,2]==0 & report[irep,3]==0){
        reportcase=array(1/(report[irep,1]+1),dim=c(pan,nbrd,nmag))
      }
      if (report[irep,1] !=0 & report[irep,2]==0 & report[irep,3]!=0){
        reportcase=ass2^report[irep,2]/(report[irep,1]*(1-ass2)^report[irep,2])+ass2^report[irep,2]}
      if (report[irep,1] !=0 & report[irep,2]!=0 & report[irep,3]==0){
        reportcase=1/(report[irep,1]*(1-pref_mag)^report[irep,3]+1)
      }
      if (report[irep,1] !=0 & report[irep,2]!=0 & report[irep,3]!=0){
        reportcase=ass2^report[irep,2]/(report[irep,1]*(1-pref_mag)^report[irep,3]*(1-ass2)^report[irep,2])+ass2^report[irep,2]}
      titles[irep,irar,,]=apply((pref_mag/(pref_mag+(1-pref_mag)*reportcase))*ms_brd1,c(2,3),mean);
    }
  }
  titles
}

date()
isoquants=NA
nivoptos=array(0,dim=c(nrow(report),length(rarete),length(level),3))
for (irep in 1:nrow(report)){
  for (irar in 1:length(rarete)){
    results=cbind(titles[irep,irar,,],pdmabrd)
    iso=contourLines(pdmabrd,c(pdmamag,1),results,length(level),level)
    for (l in 1:length(level)){
      costs=cbind(iso[[l]]$x,iso[[l]]$y);
      costs=cbind(costs,4*costs[,1]+costs[,2]); costs=costs[order(costs[,2]),]
      func=splinefun(costs[,2],costs[,1],method="fmm"); ffunc=function(a) a+4*func(a)
      opt=optimize(ffunc,c(min(costs[,2]),max(costs[,2])),min(c(1,sqrt(level[[l]])))
      nivoptos[irep,irar,l]=c(opt$minimum,func(opt$minimum),opt$objective)
      isoquants=rbind(isoquants,cbind(t(array(c(irep,rarete[irar],level[l]),dim=c(3,length(iso[[l]]$x))),costs[,1:2]))
    }
  }
}

```