・分析に作成した二項行使プログラム及びスイッチング・オプション評価

```
pricebai=155042
sigmabai=0.0751
pricetiku=185589
sigmatiku=0.0728
kprice=c(479614,459234,439720,421035,403144,386014,369611,353906,338867,324468,
310681)
kp=kprice*0.5

Valuation=function(pricebai,sigmabai,pricetiku,sigmatiku,kprice){
riskbai=(1.0144-exp(-sigmabai))/(exp(sigmabai)-exp(-sigmabai))
Px=PVx=Py=PVy=Rx=matrix(rep(NA,11^2),ncol=11)
for(i in seq(to=11,from=1)){
for(j in seq(from=1,to=i)){
Px[j,i]=pricebai*exp((i-2*j+1)*sigmabai)

Px=round(Px,2)
Px
PVx=Px
for(i in seq(to=0,from=10)){
for(j in seq(from=0,to=i)){
PVx[j,i]=(PVx[j,i+1]*riskbai+PVx[j+1,i+1]*(1-riskbai))/1.0144+pricebai*exp((i-2*j+1)*si
gmabai)
}
}
}
}
PVx=round(PVx,2)
PVx
risktiku=(1.0144-exp(-sigmatiku))/(exp(sigmatiku)-exp(-sigmatiku))
for(i in seq(to=11,from=1)){
for(j in seq(from=1,to=i)){
Py[j,i]=pricetiku*exp((i-2*j+1)*sigmatiku)

Py=round(Py,2)
```

```
Py
PVy=Py
for(i in seq(to=0,from=10)){
for(j in seq(from=0,to=i)){
PVy[j,i]=(PVy[j,i+1]*risktiku+PVy[j+1,i+1]*(1-risktiku))/1.0144+pricetiku*exp((i-2*j+1)*
sigmatiku)
}
}
}
}
PVy=round(PVy,2)
PVy
Rx=PVx
for(i in seq(to=11,from=1)){
for(j in seq(from=0,to=i)){
Rx[j,i]=max(Rx[j,i],PVy[j,i]-kp[i])
}
}
for(i in seq(to=0,from=10)){
for(j in seq(from=0,to=i)){
Rx[j,i]=max((Rx[j,i+1]*riskbai+Rx[j+1,i+1]*(1-riskbai))/1.0144+pricebai*exp((i-2*j+1)*si
gmabai),PVy[j,i]-kp[i])
}
}
Rx=round(Rx,2)
Rx
rslet=list(gennzaibai=PVx,gennzaitiku=PVy,ROA=Rx)
}
```