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# Apêndices

Neste apêndice são apresentadas as três rotinas em R utilizadas na dissertação.

A primeira rotina, usada no capítulo 5, executa o cálculo do número médio de amostras até um sinal (*NMA*) e do número médio de itens a serem inspecionados até um sinal (E(N)) para os gráficos de controle $\chi^2$ com PF e com TAV quando ocorrem deslocamentos em $\beta_*^0$ e/ou $\beta_*^1$.

```
NMA_PF_TAV = function(n0,n1,n2)
{
mat1=diag(2)
vet1=cbind(c(1,1))
vet2=cbind(c(n1,n2))
amostra1= rep(0,n1)
for(j in 1:n1)
{
amostra1[j] = j*(10/(n1+1))
}
xbarra1= mean (amostra1)
sxx1=0
s1=0
for(j in 1:n1)
{
s1= (amostra1[j]-xbarra1)^2
sxx1=sxx1+s1
}
amostra0= rep(0,n0)
for(i in 1:n0)
{
amostra0[i] = i*(10/(n0+1))
}
xbarra0= mean (amostra0)
sxx0=0
s0=0
for(i in 1:n0)
{
s0= (amostra0[i]-xbarra0)^2
sxx0=sxx0+s0
}
amostra2= rep(0,n2)
for(y in 1:n2)
{
amostra2[y] = y*(10/(n2+1))
```

```
}
xbarra2= mean (amostra2)
sxx2=0
s2=0
for(y in 1:n2)
{
s2= (amostra2[y]-xbarra2)^2
sxx2=sxx2+s2
}
p0= (n0-n2)/(n1-n2)
delta0=0
delta1=0
resposta= matrix(0,8,121)
aux=0
for(i in 1:11)
{
for(k in 1:11)
{
resposta[6,aux+k]=qchisq(p0,2)
par_centralidade0 = n0* (delta0+ delta1*xbarra0)^2 + (delta1^2)*sxx0
par_centralidade1 = n1* (delta0+ delta1*xbarra1)^2 + (delta1^2)*sxx1
par_centralidade2 = n2* (delta0+ delta1*xbarra2)^2 + (delta1^2)*sxx2
vet=(c(p0,1-p0))
ele11=pchisq(resposta[6,aux+k],2, par_centralidade1)
ele21=pchisq(resposta[6,aux+k],2, par_centralidade2)
ele12=pchisq(10.597,2, par_centralidade1)- pchisq(resposta[6,aux+k],2,
par_centralidade1)
ele22=pchisq(10.597,2, par_centralidade2)- pchisq(resposta[6,aux+k],2,
par_centralidade2)
matprinc= rbind(c(ele11,ele12),c(ele21,ele22))
matmeio=solve(mat1-matprinc)
resposta[1,aux+k]=vet%*%matmeio%*%vet1
t=pchisq(10.597,2, par_centralidade0)
resposta[2,aux+k]=1/(1-t)
resposta[3,aux+k]=delta0
resposta[4,aux+k]=delta1
resposta[5,aux+k]= p0
resposta[7,aux+k]= vet%*%matmeio%*%vet2
resposta[8,aux+k]= n0*(1/(1-t))
delta0=delta0+0.2
}
aux = aux +11
delta1=delta1+0.025
delta0 =0
}
return (resposta)
}
```

A segunda rotina, usada no capítulo 5, executa o cálculo do número médio de amostras até um sinal (*NMA*) e do número médio de itens a serem inspecionados até um sinal (E(N)) para os gráficos de controle $\chi^2$ com PF e com TAV quando ocorrem deslocamentos em $\sigma_*$.

```
NMA_PF_TAV = function(n0,n1,n2)
{
mat1=diag(2)
vet1=cbind(c(1,1))
vet2=cbind(c(n1,n2))
amostra1= rep(0,n1)
for(j in 1:n1)
{
amostra1[j] = j*(10/(n1+1))
}
xbarra1= mean (amostra1)
sxx1=0
s1=0
for(j in 1:n1)
{
s1= (amostra1[j]-xbarra1)^2
sxx1=sxx1+s1
}
amostra0= rep(0,n0)
for(i in 1:n0)
{
amostra0[i] = i*(10/(n0+1))
}
xbarra0= mean (amostra0)
sxx0=0
s0=0
for(i in 1:n0)
{
s0= (amostra0[i]-xbarra0)^2
sxx0=sxx0+s0
}
amostra2= rep(0,n2)
for(y in 1:n2)
{
amostra2[y] = y*(10/(n2+1))
}
xbarra2= mean (amostra2)
sxx2=0
s2=0
for(y in 1:n2)
{
s2= (amostra2[y]-xbarra2)^2
sxx2=sxx2+s2
}
p0= (n0-n2)/(n1-n2)
delta0=0
delta1=0
gama=1
resposta= matrix(0,7,11)
```

```
for(k in 1:11)
{
resposta[5,k]=qchisq(p0,2)
par_centralidade0 =1/(gama^2)* (n0* (delta0+ delta1*xbarra0)^2 +
(delta1^2)*sxx0)
par_centralidade1 = 1/(gama^2)* (n1* (delta0+ delta1*xbarra1)^2 +
(delta1^2)*sxx1)
par_centralidade2 = 1/(gama^2)* (n2* (delta0+ delta1*xbarra2)^2 +
(delta1^2)*sxx2 )
vet=(c(p0,1-p0))
ele11=pchisq(resposta[5,k] /(gama^2),2, par_centralidade1)
ele21=pchisq(resposta[5,k] /(gama^2),2, par_centralidade2)
ele12=pchisq(10.597/(gama^2),2, par_centralidade1)- pchisq(resposta[5,k]
/(gama^2),2, par_centralidade1)
ele22=pchisq(10.597/(gama^2),2, par_centralidade2)- pchisq(resposta[5,k]
/(gama^2),2, par_centralidade2)
matprinc= rbind(c(ele11,ele12),c(ele21,ele22))
matmeio=solve(mat1-matprinc)
resposta[1,k]=vet%*%matmeio%*%vet1
t=pchisq(10.597/(gama^2),2, par_centralidade0)
resposta[2,k]=1/(1-t)
resposta[3,k]=gama
resposta[4,k]= p0
resposta[6,k]= vet%*%matmeio%*%vet2
resposta[7,k]= n0*(1/(1-t))
gama=gama+0.2
}
return (resposta)
}
```

A terceira rotina, usada no capítulo 6, refere-se à análise de sensibilidade do gráfico com TAV. Através desta rotina são obtidos valores do *NMA,* para valores variados de $n_2$ quando ocorrem deslocamentos em $\beta_*^0$ e $\beta_*^1$.

```
NMA_PF_TAV = function(n0,n1)
{
mat1=diag(2)
vet1=cbind(c(1,1))
amostra1= rep(0,n1)
for(j in 1:n1)
{
amostra1[j] = j*(10/(n1+1))
}
xbarra1= mean (amostra1)
sxx1=0
s1=0
for(j in 1:n1)
{
s1= (amostra1[j]-xbarra1)^2
sxx1=sxx1+s1
}
delta0=0.2
delta1=0.025
resposta= matrix(0,100,28)
col=0
lin=3
n2=n0+1
while (n2<=100)
{
amostra2= rep(0,n2)
for(y in 1:n2)
{
amostra2[y] = y*(10/(n2+1))
}
xbarra2= mean (amostra2)
sxx2=0
s2=0
for(y in 1:n2)
{
s2= (amostra2[y]-xbarra2)^2
sxx2=sxx2+s2
}
p0= (n0-n2)/(n1-n2)
for(i in 1:5)
{
for(k in 1:5)
{
resposta[lin,3]=qchisq(p0,2)
par_centralidade1 = n1* (delta0+ delta1*xbarra1)^2 + (delta1^2)*sxx1
par_centralidade2 = n2* (delta0+ delta1*xbarra2)^2 + (delta1^2)*sxx2
vet=(c(p0,1-p0))
ele11=pchisq(resposta[lin,3],2, par_centralidade1)
ele21=pchisq(resposta[lin,3],2, par_centralidade2)
```

```
ele12=pchisq(10.597,2, par_centralidade1)- pchisq(resposta[lin,3],2,
par_centralidade1)
ele22=pchisq(10.597,2, par_centralidade2)- pchisq(resposta[lin,3],2,
par_centralidade2)
matprinc= rbind(c(ele11,ele12),c(ele21,ele22))
matmeio=solve(mat1-matprinc)
resposta[lin, 4+ col]=vet%*%matmeio%*%vet1
resposta[1,4+ col]=delta0
resposta[2,4+ col]=delta1
resposta[lin,2]= p0
resposta[lin,1]= n2
delta0=delta0+0.2
col = col +1
}
delta1=delta1+0.025
delta0 =0.2
}
n2=n2+1
lin=lin+1
col=0
delta1=0.025
}
return (resposta)
}
```

Por fim, a última rotina, usada no capítulo 6, refere-se à análise de sensibilidade do gráfico com TAV. Através desta rotina são obtidos valores do *NMA,* para valores variados de $n_2$ quando ocorrem deslocamentos em $\beta_*^0$, $\beta_*^1$ e $\sigma_*$.

```
NMA_PF_TAV = function(n0,n1)
{
mat1=diag(2)
vet1=cbind(c(1,1))
amostra1= rep(0,n1)
for(j in 1:n1)
{
amostra1[j] = j*(10/(n1+1))
}
xbarra1= mean (amostra1)
sxx1=0
s1=0
for(j in 1:n1)
{
s1= (amostra1[j]-xbarra1)^2
sxx1=sxx1+s1
}
delta0=0
delta1=0
gama=1.2
resposta= matrix(0,(150),183)
col=0
lin=4
n2=n0+1
while (n2<=100)
{
amostra2= rep(0,n2)
for(y in 1:n2)
{
amostra2[y] = y*(10/(n2+1))
}
xbarra2= mean (amostra2)
sxx2=0
s2=0
for(y in 1:n2)
{
s2= (amostra2[y]-xbarra2)^2
sxx2=sxx2+s2
}
p0= (n0-n2)/(n1-n2)
for(j in 1:5)
{
for(i in 1:6)
{
for(k in 1:6)
{
resposta[lin,3]=qchisq(p0,2)
par_centralidade1 =1/(gama^2)* (n1* (delta0+ delta1*xbarra1)^2 + (delta1^2)*sxx1)
par_centralidade2 = 1/(gama^2)* (n2* (delta0+ delta1*xbarra2)^2 + (delta1^2)*sxx2)
vet=(c(p0,1-p0))
```

```
ele11=pchisq(resposta[lin,3] /(gama^2),2, par_centralidade1)
ele21=pchisq(resposta[lin,3] /(gama^2),2, par_centralidade2)
ele12=pchisq(10.597/(gama^2),2, par_centralidade1)- pchisq(resposta[lin,3] /(gama^2),2,
par_centralidade1)
ele22=pchisq(10.597/(gama^2),2, par_centralidade2)- pchisq(resposta[lin,3] /(gama^2),2,
par_centralidade2)
matprinc= rbind(c(ele11,ele12),c(ele21,ele22))
matmeio=solve(mat1-matprinc)
resposta[lin, 4+ col]=vet%*%matmeio%*%vet1
resposta[1,4+ col]=delta0
resposta[2,4+ col]=delta1
resposta[3,4+ col]=gama
resposta[lin,2]= p0
resposta[lin,1]= n2
delta0=delta0+0.2
col = col +1
}
delta1=delta1+0.025
delta0 =0
}
delta1=0
delta0 =0
gama=gama+0.2
}
n2=n2+1
lin=lin+1
col=0
gama=1.2
}
return (resposta)
}
```