

R codes for "Competing risks regression models with covariates-adjusted censoring weight under the generalized case-cohort design"

By Soyoung Kim and Yayun Xu

There are three R functions including weight functions, beta estimations, and variance estimations for competing risks regression under generalized case-cohort studies.

```
###weight functions
find.weightcc = function(gamma, disease, v, delta, choice = 1, eta) {
  weightcc = c()
  if (choice == 1) { #weight function for single case-cohort study
    for (i in unique(v)) {
      num = sum(gamma[v == i] * (1 - (disease[v == i] == 1)))
      deno = sum((1 - (disease[v == i] == 1)))
      deno = deno * Tq / F387.9701Tf60.0550Td[(f)]TJ/F537.9701Tf10.150Td[(q)]TJ/F327.9701Tf6.4810Td[(.)-323(e)-152(s)-152(t)-695]
    }
    gelse {
      q.est = numq / denoq
      weightcc[v==i] = (1 - (disease[v==i] == 1)) * gamma[v==i] / alpha.est +
        (disease[v==i]==1) * (gamma[v==i] + (1 - gamma[v==i]) * (eta[v==i] == 1)) /
        (alpha.est + (1 - alpha.est) * q.est)
    }
  }
  gelse if (choice == 3) { # efficient weight function for multiple case-cohort studies

```


2: *covariate-unadjusted weights*

```
foo.1 = matrix(rep(t(kmest.1(faili)), each=npop), npop, Li)
```

```
S12 = t(z2expz) %%
```

```
for (j in 1:n) f
  if (time[i] < time[j])
    rt[i, j] = 0
g
g
Yrt = rt - Nrt
phit = find.weightcc(gamma
```

```

foo = matrix(rep(t(kmest(time[v == i])), each = n), n-1, n) / fff
foo[gg3] = 1
Gcweight[[i.name]] = foo
g
g
wY.all = Yrt

dNr.all = (do.call(cbind, replicate(n, time, simplify = FALSE))
== do.call(rbind, replicate(n, time, simplify = FALSE))) 1
dNr.all[disease != 1, ] = 0
wdN.all = dNr.all

p = 1
SI = 0
SI0 = list()
Ec = list()

for (i in unique(v)) f
  i.name <- paste(i)
  dis1 = (disease[disease == 1]) 1
  v1 = (v[disease == 1]) 1
  n1 = sum(v == i)
  expz <- exp(z[v == i] beta)
  zexpz <- expz z [v == i]
  temp0 <- colSums(expz (phit[v == i] wY.all[v == i, ] Gcweight[[i.name]]))
  SI0[[i.name]] <- temp0 + (temp0 == 0)
  SI1 <- colSums(zexpz (phit[v == i] wY.all[v == i, ] Gcweight[[i.name]]))
  z2expz = expz z[v == i] z[v == i]
  SI2 = colSums(z2expz (phit[v == i] wY.all[v == i, ] Gcweight[[i.name]]))
  SI1overSI0hat <- SI1 / SI0[[i.name]]
  SI2overSI0hat = SI2 / SI0[[i.name]]
  Ec[[i.name]] = SI1overSI0hat

  ipart1 = do.call(rbind, replicate(n1, SI2overSI0hat, simplify = F))
  wdN.all[v == i, ] Gcweight[[i.name]] phit[v == i]
  lpart1hat = sum(ipart1)

  E2 = SI1overSI0hat SI1overSI0hat
  ipart2 = do.call(rbind, replicate(n1, E2, simplify = F))
  wdN.all[v == i, ] Gcweight[[i.name]] phit[v == i]
  lpart2hat = sum(ipart2)

  SI <- SI + (lpart1hat - lpart2hat)
g
templ = SI
Yt = (do.call(cbind, replicate(n, time, simplify = FALSE))
>= do.call(rbind, replicate(n, time, simplify = FALSE))) 1
Nct = (do.call(cbind, replicate(n, time, simplify = FALSE))
<= do.call(rbind, replicate(n, time, simplify = FALSE))) 1
Nct[disease != 0, ] = 0

var.1 = 0
expz = exp(z beta)
for (i in unique(v)) f
  i.name = paste(i)
  n1 = sum(v == i)
  dlamb10t = colSums(wdN.all[v == i, ] Gcweight[[i.name]] phit[v == i] )

```

```

/ S10[[i.name]]
zminEc = (do.call(cbind, replicate(n, z[v == i], simplify = FALSE)))
- (do.call(rbind, replicate(sum(v == i), Ec[[i.name]], simplify = FALSE)))

wdM = wdN.all[v == i,] Gcweight[[i.name]] - wY.all[v == i,]
Gcweight[[i.name]] expz[v == i] (do.call(rbind, replicate(sum(v == i),
dlamb10t, simplify = FALSE)))
eta11 = rowSums(zminEc wdM)
eta21 = c()
if (choice.c == 1){
WeightedY<- phit[v==i] Yt[v==i,]
gamma.hat<- fit.cox$coef
expg<-exp(z[v==i] gamma.hat)
zexpg<-z[v==i] expg
s0c<- colSums( WeightedY expg)
s0c<- s0c + (s0c==0)
s1c<- colSums( WeightedY zexpg)
ecox <-s1c/s0c
S1overS02hat<- ecox/s0c
zc_min_ec<- (do.call(cbind, replicate(n, z[v==i], simplify = FALSE)))
- (do.call(rbind, replicate(nl, ecox, simplify = FALSE)))
ilc_mat<-vcov(fit.cox)[1]
censor.w<-

```



```

deltaw = do.call(cbind, replicate(n, wlict, simplify = F)) -
do.call(rbind, replicate(nl, wct, simplify = F))
ind = do.call(cbind, replicate(n, time[v == i], simplify = F))
< do.call(rbind, replicate(sum(v == i), time, simplify = F))
eta21 = c(eta21, sum(deltaw zminEc ind wdM))

```

g

```

eta.comb = (eta11 + eta21)
eta.comb2 = eta.comb eta.comb
qest1 = sum(eta[v==i]==1)/sum(disease[v==i]==1& gamma[v==i]==0)
alphaest = sum(

```

```

Q = wY.all[v == i,] Gcweight[[i.name]] zminEc expz[v == i]
if (choice.c == 1) f
  eta31 = rowSums((1 - delta[v == i]) Q do.call(rbind, replicate(
    sum(v == i), dlamb10t, simplify = FALSE)))
  eta32 = (1 - delta[v == i]) eta21
  eta3 <- eta31 - eta32
else f
  eta3 = rowSums((1 - delta[v == i]) Q do.call(rbind, replicate(
    sum(v == i), dlamb10t, simplify = FALSE)))
g
V331 = sum(eta.comb eta.comb

```