

## Exercises - SOLUTIONS

- ```
n <- 100; m <- 10
x <- runif(n)
lp <- 3*x-1
mu <- binomial()$linkinv(lp)
y <- rbinom(1:n,m,mu)
par(mfrow=c(2,2))
plot(glm(y/m ~ x,family=binomial,weights=rep(m,n)))

## example glm fit...
b <- glm(y/m ~ x,family=binomial,weights=rep(m,n))
reps <- 200;mu <- fitted(b)
rsd <- matrix(0,reps,n) # array for simulated resids
runs <- rep(0,reps) # array for simulated run counts
for (i in 1:reps) { # simulation loop
  ys <- rbinom(1:n,m,mu) # simulate from fitted model
  ## refit model to simulated data
  br <- glm(ys/m ~ x,family=binomial,weights=rep(m,n))
  rs <- residuals(br) # simulated resids (meet assumptions)
  rsd[i,] <- sort(rs) # store sorted residuals
  fv.sort <- sort(fitted(br),index.return=TRUE)
  rs <- rs[fv.sort$ix] # order resids by sorted fit values
  rs <- rs > 0 # check runs of +ve, -ve resids
  runs[i] <- sum(rs[1:(n-1)]!=rs[2:n])
}

• # plot original ordered residuals, and simulation envelope
for (i in 1:n) rsd[,i] <- sort(rsd[,i])
par(mfrow=c(1,1))
plot(sort(residuals(b)),(1:n-.5)/n) # original
## plot 95% envelope ....
lines(rsd[5,],(1:n-.5)/n);lines(rsd[reps-5,],(1:n-.5)/n)
```