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#####
## Data ##
#####
d <- read.table("c:/a/millions3.csv", sep=";", header=T, strip.white=T)
#nam <-
(read.table("c:/a/mill_names.csv", sep=";", header=T, colClasses=c(rep("character", 65)), header=T, strip.white=T))
#nam<-list(nam)
#colnames(d)<-nam
summary(d)

class(d$gamma)
#typeof(d$gamma)
hist(d$gamma)

#####
## Linear models ##
#####

### Sala-i-Martin linear model: Init.level+Prim.school.enrolm.+Life
Expectancy
lm.sim<-lm(d$gamma~d$X1+d$X3+d$X2, x=TRUE, y=TRUE)
summary(lm.sim)
par(mfrow=c(2, 2))
plot(lm.sim)
#tests
require(lmtest)
resettest(lm.sim, power=2:3, type="regressor")
resettest(lm.sim, power=2, type="fitted")
bptest(lm.sim)

### Sala-i-Martin linear model: Init.level+Prim.school.enrolm.+Life
Expectancy
lm.sim<-lm(d$gamma~d$X1+d$X2, x=TRUE, y=TRUE)
summary(lm.sim)
par(mfrow=c(2, 2))
plot(lm.sim)
#tests
resettest(lm.sim, power=2:3, type="regressor")
resettest(lm.sim, power=2, type="fitted")
bptest(lm.sim)

### Levine and Rene linear model: Init.level+Investm.
gr.(2)+Sec.school.enrolm.+Pop.growth
lm.lr<-lm(d$gamma~d$X1+d$X42+d$X43+d$X21+d$X16, x=TRUE, y=TRUE)
summary(lm.lr)
lm.lr1<-lm(d$gamma~d$X1+d$X42+d$X21+d$X16, x=TRUE, y=TRUE)
summary(lm.lr1)
lm.lr2<-lm(d$gamma~d$X1+d$X43+d$X21+d$X16, x=TRUE, y=TRUE)
summary(lm.lr2)
lm.lr3<-lm(d$gamma~d$X1+I(d$X42+d$X43)+d$X21+d$X16, x=TRUE, y=TRUE)

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summary(lm.lr3)
lm.lr<-lm(d$gamma~d$X1+d$X42+d$X43+d$X21,x=TRUE,y=TRUE)
summary(lm.lr)
dev.new()
par(mfrow=c(2,2))
plot(lm.lr)
#tests
require(lmtest)
resettest(lm.lr,power=2:3,type="regressor")
resettest(lm.lr1,power=2:3,type="regressor")
resettest(lm.lr2,power=2:3,type="regressor")
resettest(lm.lr3,power=2:3,type="regressor")
bptest(lm.lr)
bptest(lm.lr1)
bptest(lm.lr2)
bptest(lm.lr3)

#####
## NP comes in ##
#####
require(np)
#####
## Tests ##
#####
### Sala-i-Martin model: Init.level+Prim.school.enrolm.+Life Expectancy
## y=T,x=T in lm()!
npcmstest(formula=d$gamma~d$X1+d$X3+d$X2,model=lm.sim)

### Levine and Rene model: Init.level+Investm.
gr.(2)+Sec.school.enrolm.+Pop.growth
npcmstest(formula=d$gamma~d$X1+d$X42+d$X43+d$X21+d$X16,model=lm.lr)
npcmstest(formula=d$gamma~d$X1+d$X42+d$X21+d$X16,model=lm.lr1)
npcmstest(formula=d$gamma~d$X1+d$X43+d$X21+d$X16,model=lm.lr2)
#npcmstest(formula=d$gamma~d$X1+I(d$X42+d$X43)+d$X21+d$X16,model=lm.lr3)
npcmstest(formula=d$gamma~d$X1+d$X42+d$X43+d$X21,model=lm.lr)

#inv<-d$X42+d$X43
#npcmstest(formula=d$gamma~d$X1+inv+d$X21+d$X16,model=lm.lr3)

#####
## Models without additional X'es ##
#####
### Sala-i-Martin model: Init.level+Prim.school.enrolm.+Life Expectancy
bw.sim<-npregbw(formula=d$gamma~d$X1+d$X3+d$X2)
bw.sim
summary(lm.sim)
npsigtest(bw.sim)
cor(lm.sim$x)
eigen(crossprod(lm.sim$x))
np.sim<-npreg(bw.sim)
dev.new()
par(mfrow=c(2,2))

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plot(np.sim)
summary(np.sim)
objects(summary(lm.sim))
objects(summary(np.sim))
objects(np.sim)
c(summary(lm.sim)$r.squared,np.sim$R2)

bw.sim2<-npregbw(formula=d$gamma~d$X1+d$X2)
bw.sim2
npsigtest(bw.sim2)
np.sim2<-npreg(bw.sim2)
dev.new()
par(mfrow=c(2,2))
plot(np.sim2)
summary(np.sim2)
c(summary(lm.sim)$r.squared,np.sim$R2,np.sim2$R2)

## Partially linear
bws.sim<-
npplregbw(formula=d$gamma~d$X1|+d$X3+d$X2)#,ydat=d$gamma,xdat=d$X1,zdat=dat
a.frame(d$X3,d$X2))

D<-na.omit(cbind(d$gamma,d$X1,d$X2,d$X3))
y<-D[,1]
x1<-D[,2]
x2<-D[,3]
x3<-D[,4]
bws.sim<-npplregbw(formula=y~x1|x2+x3)
bws.sim<-npplregbw(formula=y~x1|x2)
nppl.sim<-npplreg(bws.sim)
summary(nppl.sim)
objects(nppl.sim)
dev.new()
plot(nppl.sim,theta=50,phi=10)
objects(nppl.sim)

c(summary(lm.sim)$r.squared,np.sim$R2,np.sim2$R2,nppl.sim$R2)

### Levine and Rene model: Init.level+Investm.
gr.(2)+Sec.school.enrolm.+Pop.growth
bws.lr<-npregbw(formula=d$gamma~d$X1+d$X42+d$X43+d$X21)
np.lr<-npreg(bws.lr)

bws.lr<-npregbw(formula=d$gamma~d$X1+d$X42+d$X21)
np.lr<-npreg(bws.lr)
npsigtest(bws.lr)

par(mfrow=c(2,2))
plot(np.lr)

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bws.lr1<-npregbw(formula=d$gamma~d$X1+d$X21)
np.lr1<-npreg(bws.lr1)
npsigtest(bws.lr1)
par(mfrow=c(2,2))
plot(np.lr1)

bws.lr2<-npregbw(formula=d$gamma~d$X1+d$X21+d$X16)
np.lr2<-npreg(bws.lr2)
npsigtest(bws.lr2)
par(mfrow=c(2,2))
plot(np.lr2)

c(summary(lm.lr)$r.squared,np.lr$R2,np.lr1$R2,np.lr2$R2)

### Levine and Rene linear model: Init.level+Investm.
gr.(2)+Sec.school.enrolm.+Pop.growth
lm.lr<-lm(d$gamma~d$X1+d$X21,x=TRUE,y=TRUE)
summary(lm.lr)
dev.new()
par(mfrow=c(2,2))
plot(lm.lr)
#tests
require(lmtest)
resettest(lm.lr,power=2:3,type="regressor")
bptest(lm.lr)

D<-na.omit(cbind(d$gamma,d$X16,d$X1,d$X21))
y<-D[,1]
x1<-D[,2]
x2<-D[,3]
x3<-D[,4]
bws.lr<-npplregbw(formula=y~x1|x2+x3)
nppl.lr<-npplreg(bws.lr)
summary(nppl.lr)
objects(nppl.lr)
dev.new()
plot(nppl.lr,theta=50,phi=10)
objects(nppl.lr)

c(summary(lm.lr)$r.squared,np.lr$R2,np.lr1$R2,np.lr2$R2,nppl.lr$R2)

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