Example 2-8

September 12, 2020

```
[ ]: # first install the following packages and library
     install.packages("pder")
     install.packages("plm")
     library("plm")

     # import the data, frame the data, and create the model Qeq
     data("TobinQ", package = "pder")
     pTobinQ <- pdata.frame(TobinQ)
     Qeq <- ikn ~ qn

     # generate the 4 different random effect models
     Q.swar <- plm(Qeq, pTobinQ, model = "random", random.method = "swar")
     Q.walhus <- update(Q.swar, random.method = "swar")
     Q.amemiya <- update(Q.swar, random.method = "amemiya")
     Q.nerlove <- update(Q.swar, random.method = "nerlove")
     Q.models <- list(swar = Q.swar, walhus = Q.walhus,
                      amemiya = Q.amemiya, nerlove = Q.nerlove)
```

```
[3]: ##--------------------------------Block 1---------------------------------

     #### Example 2-8 ####

     ## -----------------------------------------------------------------------

     # two-ways effect model
     Q.models2 <- lapply(Q.models, function(x) update(x, effect = "twoways"))

     # extracts the standard deviations of the 3 components of the error term
     sapply(Q.models2, function(x) sqrt(ercomp(x)$sigma2))
```

	swar	walhus	amemiya	nerlove
idios	0.06969581	0.06969581	0.06969033	0.06850461
id	0.04508083	0.04508083	0.04572733	0.04734635
time	0.02093039	0.02093039	0.02170287	0.02261552

```
[4]: ##-----------------------------Block 2----------------------------------

     # extracts the theta parameters
```

```
sapply(Q.models2, function(x) ercomp(x)$theta)
```

	swar	walhus	amemiya	nerlove
id	0.7471657	0.7471657	0.7505347	0.7624338
time	0.7640029	0.7640029	0.7719755	0.7842818
total	0.6863154	0.6863154	0.6932541	0.7084945