

```
# Code 2 - START
```

```
#####
```

```
library(tidyverse)
library(GRS.test)
```

```
### GRS - test
```

```
## ALL -----
```

```
n <- 25
m <- 25
```

```
# 4x4
grs_p <- c()
grs_s <- c()
grs_1 <- c()
grs_2 <- c()
```

```
for (i in 1:n) {
  factor_str <- str_c('factor_all_',toString(i, width = NULL),'.csv')
  factor = subset(read.csv(file = factor_str), select = -c(date) )
  #grs_s <- c()
  for (j in 1:3) {
    port_ret_str <- str_c('port_ret_4x4_all_',toString(j, width = NULL),'.csv')
    port_ret = subset(read.csv(file = port_ret_str), select = -c(date) )

    grs_s[[j]] <- GRS.test(port_ret,factor)$GRS.stat
    grs_p[[j]] <- GRS.test(port_ret,factor)$GRS.pval
  }
  grs_1[[(length(grs_1) + 1)]] <- grs_s
  grs_2[[(length(grs_2) + 1)]] <- grs_p
}
}
```

```
grs_stat_4x4_all <- as.data.frame(do.call(rbind, grs_1))
grs_pval_4x4_all <- as.data.frame(do.call(rbind, grs_2))
```

```
## GREEN -----
```

```
# 4x4
grs_p <- c()
grs_s <- c()
grs_1 <- c()
grs_2 <- c()
```

```
for (i in 1:n) {
  factor_str <- str_c('factor_g_',toString(i, width = NULL),'.csv')
  factor = subset(read.csv(file = factor_str), select = -c(date) )
  #grs_s <- c()
  for (j in 1:3) {
    port_ret_str <- str_c('port_ret_4x4_g_',toString(j, width = NULL),'.csv')
    port_ret = subset(read.csv(file = port_ret_str), select = -c(date) )
```

```

grs_s[[j]] <- GRS.test(port_ret,factor)$GRS.stat
grs_p[[j]] <- GRS.test(port_ret,factor)$GRS.pval
}
grs_1[[length(grs_1) + 1]] <- grs_s
grs_2[[length(grs_2) + 1]] <- grs_p
}

grs_stat_4x4_g <- as.data.frame(do.call(rbind, grs_1))
grs_pval_4x4_g <- as.data.frame(do.call(rbind, grs_2))

## HALF GREEN -----
# 4x4
grs_p <- c()
grs_s <- c()
grs_1 <- c()
grs_2 <- c()

for (i in 1:n) {
  factor_str <- str_c('factor_hg_',toString(i, width = NULL),'.csv')
  factor = subset(read.csv(file = factor_str), select = -c(date) )
  #grs_s <- c()
  for (j in 1:3) {
    port_ret_str <- str_c('port_ret_4x4_hg_',toString(j, width = NULL),'.csv')
    port_ret = subset(read.csv(file = port_ret_str), select = -c(date) )

    grs_s[[j]] <- GRS.test(port_ret,factor)$GRS.stat
    grs_p[[j]] <- GRS.test(port_ret,factor)$GRS.pval

  }
  grs_1[[length(grs_1) + 1]] <- grs_s
  grs_2[[length(grs_2) + 1]] <- grs_p
}

grs_stat_4x4_hg <- as.data.frame(do.call(rbind, grs_1))
grs_pval_4x4_hg <- as.data.frame(do.call(rbind, grs_2))

# Export -----
# All
write.csv(apply(grs_stat_4x4_all,2,as.character),"grs_stat_4x4_all.csv", row.names = FALSE)
write.csv(apply(grs_pval_4x4_all,2,as.character),"grs_pval_4x4_all.csv", row.names = FALSE)

# Green
write.csv(apply(grs_stat_4x4_g,2,as.character),"grs_stat_4x4_g.csv", row.names = FALSE)
write.csv(apply(grs_pval_4x4_g,2,as.character),"grs_pval_4x4_g.csv", row.names = FALSE)

# Half Green
write.csv(apply(grs_stat_4x4_hg,2,as.character),"grs_stat_4x4_hg.csv", row.names = FALSE)
write.csv(apply(grs_pval_4x4_hg,2,as.character),"grs_pval_4x4_hg.csv", row.names = FALSE)

```

Code 2 - END

Run Code 1 Part 2 in Python