

Notes, pc-lab

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2019-03-08

```
## -- Attaching packages ----- tidyverse 1.2.1 --
## v ggplot2 3.1.0      v purrr  0.2.5
## v tibble  2.0.1      v dplyr  0.8.0.1
## v tidyr   0.8.2      v stringr 1.3.1
## v readr   1.3.1      v forcats 0.3.0

## -- Conflicts ----- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()     masks stats::lag()

## Loading required package: MASS

##
## Attaching package: 'MASS'

## The following object is masked from 'package:dplyr':
##
##     select

## Loading required package: strucchange

## Loading required package: zoo

##
## Attaching package: 'zoo'

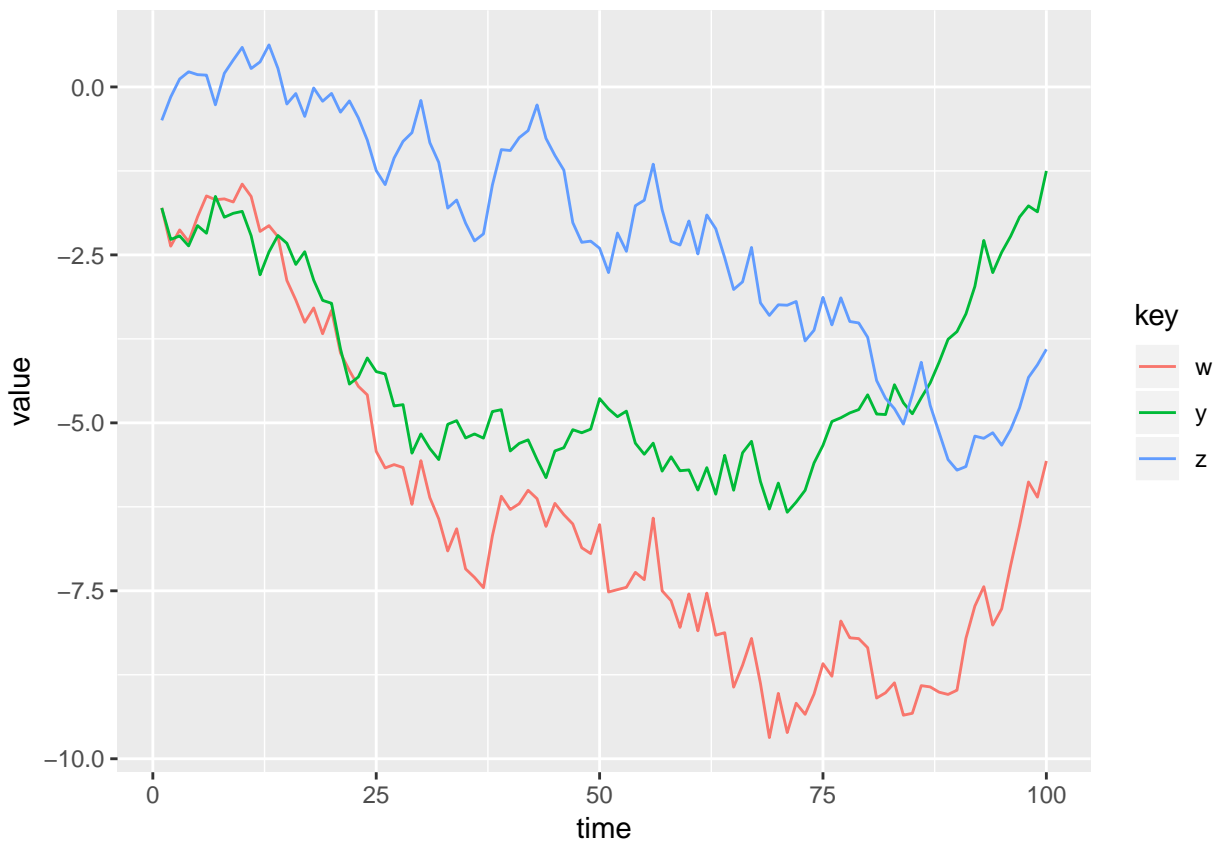
## The following objects are masked from 'package:base':
##
##     as.Date, as.Date.numeric

## Loading required package: sandwich

##
## Attaching package: 'strucchange'

## The following object is masked from 'package:stringr':
##
##     boundary

## Loading required package: lmtest
```



```
##
## #####
## # Elliot, Rothenberg and Stock Unit Root Test #
## #####
##
## Test of type DF-GLS
## detrending of series with intercept
##
## Call:
## lm(formula = dfpls.form, data = data.dfpls)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.68436 -0.21096 -0.00792  0.22304  0.68417
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## yd.lag        -0.01315    0.01511  -0.870   0.3867
## yd.diff.lag1  -0.08163    0.11051  -0.739   0.4622
## yd.diff.lag2   0.04073    0.11013   0.370   0.7125
## yd.diff.lag3   0.24478    0.10890   2.248   0.0273 *
## yd.diff.lag4   0.16777    0.11064   1.516   0.1333
## yd.diff.lag5  -0.08670    0.11065  -0.784   0.4356
## yd.diff.lag6   0.04129    0.10969   0.376   0.7076
## yd.diff.lag7  -0.07174    0.11124  -0.645   0.5208
## yd.diff.lag8   0.19965    0.11261   1.773   0.0800 .
```

```

## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.322 on 82 degrees of freedom
## Multiple R-squared:  0.1372, Adjusted R-squared:  0.04253
## F-statistic: 1.449 on 9 and 82 DF,  p-value: 0.1811
##
##
## Value of test-statistic is: -0.8702
##
## Critical values of DF-GLS are:
##           1pct  5pct 10pct
## critical values -2.59 -1.94 -1.62
##
## #####
## # Elliot, Rothenberg and Stock Unit Root Test #
## #####
##
## Test of type DF-GLS
## detrending of series with intercept
##
##
## Call:
## lm(formula = dfgls.form, data = data.dfgls)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.8912 -0.3159 -0.1240  0.1978  0.5528
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## yd.lag        -0.003967   0.022641  -0.175   0.861
## yd.diff.lag1    0.017255   0.112675   0.153   0.879
## yd.diff.lag2    0.070054   0.111785   0.627   0.533
## yd.diff.lag3   -0.105795   0.111205  -0.951   0.344
## yd.diff.lag4    0.015126   0.111707   0.135   0.893
## yd.diff.lag5   -0.104916   0.112335  -0.934   0.353
## yd.diff.lag6   -0.126666   0.111347  -1.138   0.259
## yd.diff.lag7   -0.041562   0.112254  -0.370   0.712
## yd.diff.lag8    0.091402   0.112034   0.816   0.417
##
## Residual standard error: 0.3852 on 82 degrees of freedom
## Multiple R-squared:  0.05913,    Adjusted R-squared:  -0.04414
## F-statistic: 0.5726 on 9 and 82 DF,  p-value: 0.8158
##
##
## Value of test-statistic is: -0.1752
##
## Critical values of DF-GLS are:
##           1pct  5pct 10pct
## critical values -2.59 -1.94 -1.62
##
## #####

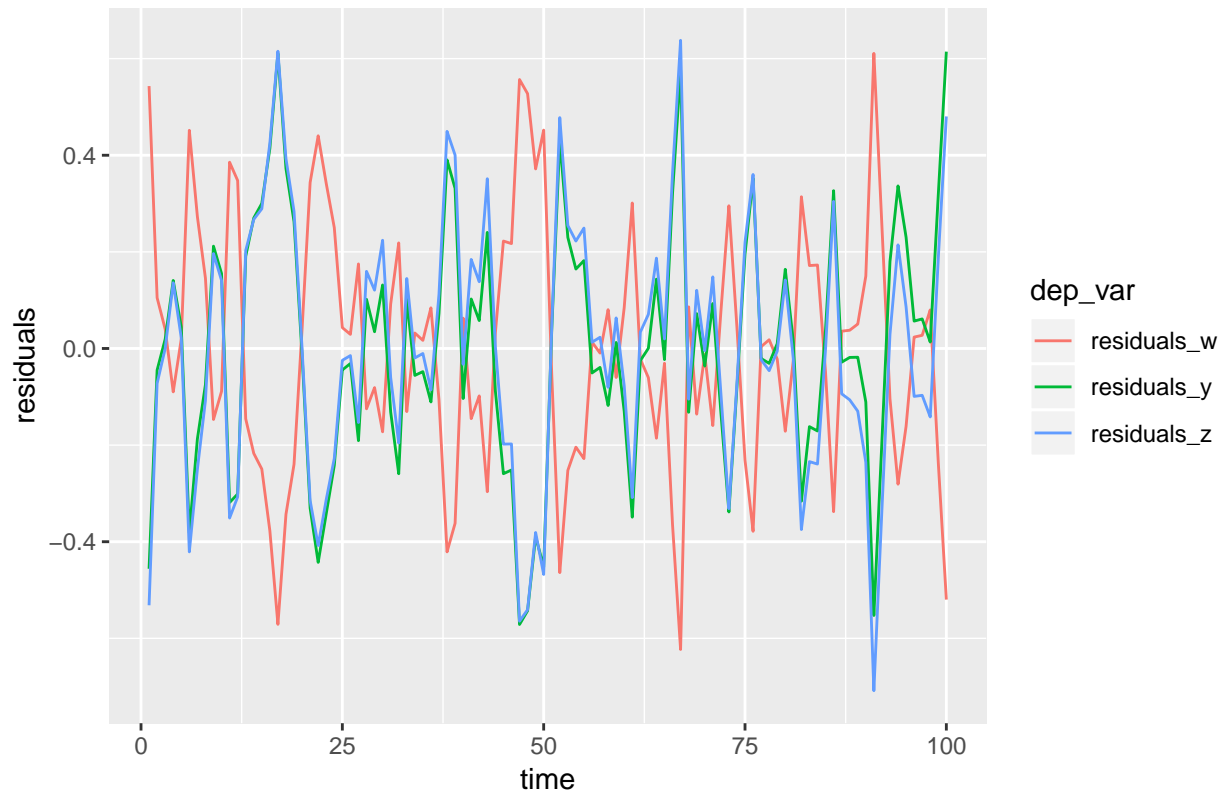
```

```

## # Elliot, Rothenberg and Stock Unit Root Test #
## #####
##
## Test of type DF-GLS
## detrending of series with intercept
##
##
## Call:
## lm(formula = dfpls.form, data = data.dfpls)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.04776 -0.32329 -0.08932  0.20461  0.93149
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## yd.lag          -0.01186    0.01255  -0.945   0.3474
## yd.diff.lag1    -0.14566    0.10984  -1.326   0.1885
## yd.diff.lag2     0.07235    0.11110   0.651   0.5167
## yd.diff.lag3     0.03466    0.11277   0.307   0.7594
## yd.diff.lag4     0.22408    0.11419   1.962   0.0531
## yd.diff.lag5     0.03139    0.11627   0.270   0.7879
## yd.diff.lag6     0.11737    0.11659   1.007   0.3170
## yd.diff.lag7     0.05241    0.11900   0.440   0.6608
## yd.diff.lag8     0.10173    0.11528   0.883   0.3801
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4467 on 82 degrees of freedom
## Multiple R-squared:  0.1231, Adjusted R-squared:  0.02686
## F-statistic: 1.279 on 9 and 82 DF,  p-value: 0.2608
##
##
## Value of test-statistic is: -0.945
##
## Critical values of DF-GLS are:
##              1pct  5pct 10pct
## critical values -2.59 -1.94 -1.62

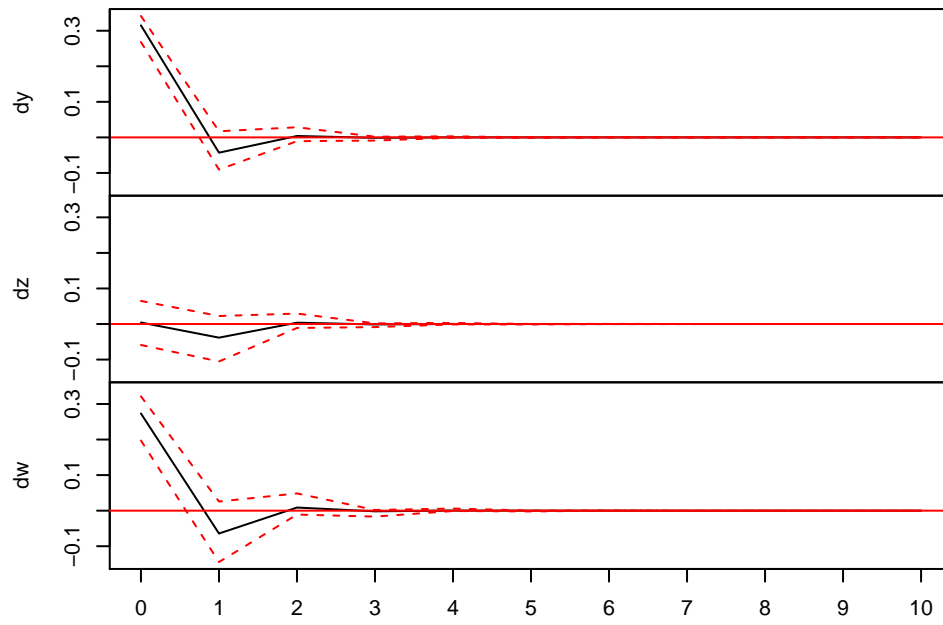
```

White noise?

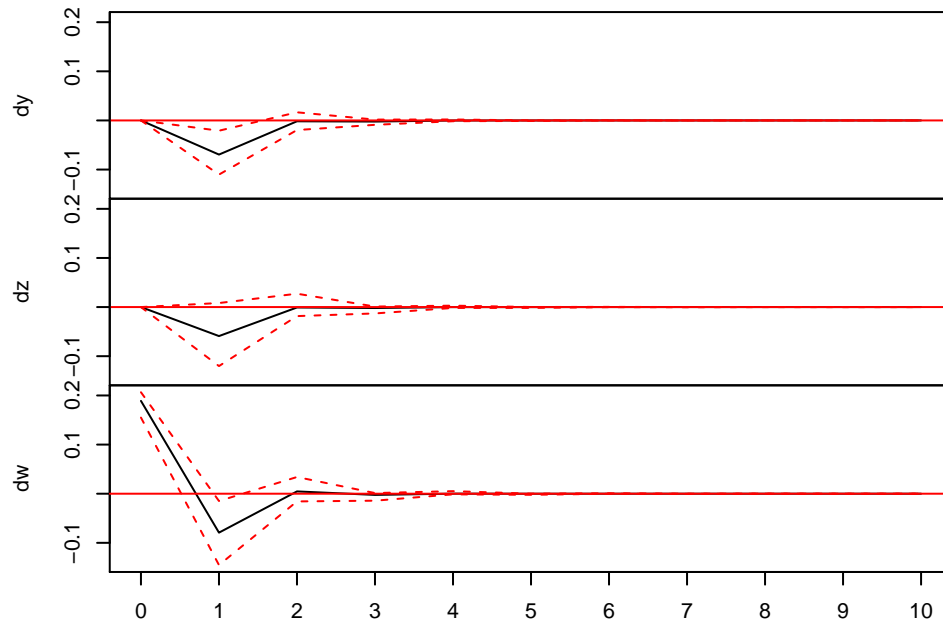


```
##
## #####
## # Augmented Dickey-Fuller Test Unit Root / Cointegration Test #
## #####
##
## The value of the test statistic is: -4.0742
##
## #####
## # Augmented Dickey-Fuller Test Unit Root / Cointegration Test #
## #####
##
## The value of the test statistic is: -4.2268
##
## #####
## # Augmented Dickey-Fuller Test Unit Root / Cointegration Test #
## #####
##
## The value of the test statistic is: -4.2248
##
##          dy          dz          dw
## dy 0.10817013 0.00457995 0.08931914
## dz 0.00457995 0.13746208 0.10570552
## dw 0.08931914 0.10570552 0.19561589
```

Orthogonal Impulse Response from dy

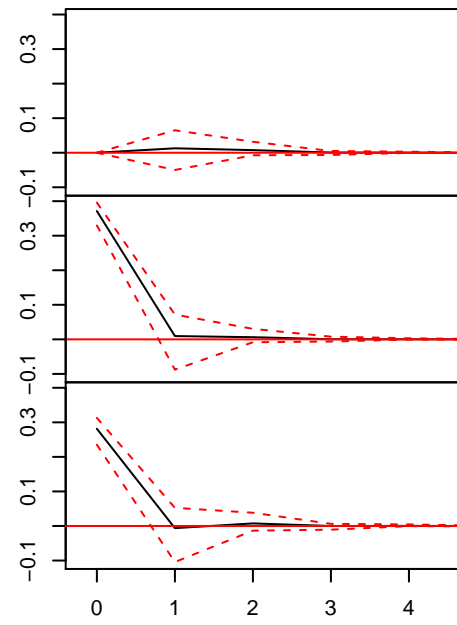


95 % Bootstrap CI, 100 runs
Orthogonal Impulse Response from dw



95 % Bootstrap CI, 100 runs

Orthogonal Impulse Response from dz



95 % Bootstrap CI, 100 runs