

Time Series Analysis-OpenBudgets.eu

Install:

Load *devtools* library or install it if not already:

```
install.packages("devtools")
```

Then install *TimeSeries.OBeu* from Github

```
devtools::install_github("okgreece/TimeSeries.OBeu")
```

And load the library

```
library(TimeSeries.OBeu)
```

Use:

The basic function is:

```
ts.analysis(tsdata,x.order=NULL,h=1)
```

where *tsdata*: The input univariate time series data *x.order*: An integer vector of length 3 specifying the order of the Arima model and *h*: The number of prediction steps

R Example

The package includes the following time series data: Athens_draft_ts, Athens_revised_ts, Athens_reserved_ts, Athens_approved_ts and Athens_executed_ts.

```
Athens_draft_ts
```

```
## Time Series:
## Start = 2004
## End = 2015
## Frequency = 1
## [1] 720895000 628937000 618550000 724830000 858942000 919508000 977488000
## [8] 931607000 866517393 667108000 773422555 759559284
```

We select for example the approved budget phase of Athens and we want to predict 4 years ahead.

```
ts.analysis(tsdata = Athens_approved_ts, h=4)
```

```
## {"acf.param":{"acf.parameters":{"acf": [1,0.427,0.2297,0.0089,-0.3902,-0.4655,-0.4154,-0.2643,0.0666,
```

If we can set a specific order to fit the model for the same prediction steps. We select for example a three-length vector of $p=2$ (*AR order*) $d=1$ (*first differences*) and $q=1$ (*MA order*).

```
ts.analysis(tsdata = Athens_approved_ts, x.order=c(2,1,1), h=4)
```

```
## {"acf.param":{"acf.parameters":{"acf": [1,0.427,0.2297,0.0089,-0.3902,-0.4655,-0.4154,-0.2643,0.0666,
```

OpenCPU Short Guide - TimeSeries.OBeu

Go to: <http://okfnrg.math.auth.gr/ocpu/test/>

How to use functions:

Type to the endpoint:

```
../library/ {name of the library} /R/ {function}
```

If you want to see the function parameters you should:

- Select Method:

Get

and in order to run a function you should:

- Select Method:

Post

Example #1:

1. Go to <http://okfnrg.math.auth.gr/ocpu/test/>
2. Copy and paste the following function to the endpoint

```
../library/TimeSeries.OBeu/R/ts.analysis
```

3. *Select Method:*

Post

4. **Add parameters** and set:

Define the input time series data:

- *Param Name:*

tsdata

- *Param Value* one of the following:

Athens_draft_ts

Athens_revised_ts

Athens_reserved_ts

Athens_approved_ts

Athens_executed_ts

Define the order of the model fits and forecasts (*optional*):

- *Param Name:*

x.order

- *Param Value* -for example:

```
c(2,1,1)
```

Define the prediction steps (*default is 1 prediction step*):

- *Param Name:*

```
h
```

- *Param Value* -for example:

```
4 # (or another number, default h=1)
```

5. Ready! Click on **Ajax request!**

6. To see the results:

copy the `/ocpu/tmp/{this}/R/.val` (the first choice on the right panel)

7. and paste `http://okfnrg.math.auth.gr/ocpu/tmp/ {this} /R/.val` on a new tab.

Example #2 - Rudolf/Open Spending Time Series

1. Go to `http://okfnrg.math.auth.gr/ocpu/test/`

2. Copy and paste the following function to the endpoint

```
../library/TimeSeries.OBeu/R/open_spending.ts
```

3. *Select Method:*

```
Post
```

4. **Add parameters** and set:

Define the input time series data:

- *Param Name:*

```
json_data
```

- *Param Value* -the following output from open spending api or you can provide the json URL:

```
'{"page":0,"page_size":30,"total_cell_count":15,"cell":[],"status":"ok","cells":[{"global__fiscalPeriod
```

Define the time label of the json input:

- *Param Name:*

```
time
```

- *Param Value* -for example:

```
"global__fiscalPeriod__28951.notation" # or
```

```
'global__fiscalPeriod__28951.notation'
```

Define the amount label of the json input:

- *Param Name:*

```
amount
```

- *Param Value* -for example:

```
'global__amount__0397f.sum' # or  
"global__amount__0397f.sum"
```

Define the order of the model fits and forecasts (*optional*):

- *Param Name*:

```
order
```

- *Param Value* -for example:

```
c(3,1,1)
```

Define the prediction steps (*default is 1 prediction step*):

- *Param Name*:

```
prediction_steps
```

- *Param Value* -for example:

```
4 # (or another number, default h=1)
```

5. Ready! Click on **Ajax request!**

6. To see the results:

copy the `/ocpu/tmp/{this}/R/.val` (the first choice on the right panel)

7. and paste `http://okfnrg.math.auth.gr/ocpu/tmp/ {this} /R/.val` on a new tab.

Further Details:

- <https://www.opencpu.org/help.html>
- <https://cran.r-project.org/web/packages/opencpu/vignettes/opencpu-server.pdf>
- <https://www.opencpu.org/jslib.html>

Github:

- <https://github.com/okgreece/TimeSeries.OBeu>