

# R Package **tsoutliers**

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January 2015

## Abstract

This is a minimal introduction to package **tsoutliers**. Further information is available in the references given below.

## 1 Introduction

Details about the methodology and algorithms implemented in the package are given in [this document](#).

As a preliminary introduction and discussion see these posts: <http://www.jalobe.com:8080/blog/tsoutliers/> and <http://stats.stackexchange.com/questions/104882/>.

**Examples** Fit a local level model to the Nile time series and check for the presence of possible outliers (additive outliers, level shifts or transitory changes):

```
> library("tsoutliers")
> resNile1 <- tso(y = Nile, types = c("AO", "LS", "TC"),
+   tsmethod = "stsm", args.tsmode1 = list(model = "local-level"))
> resNile1$fit$call$xreg <- NULL
> resNile1
```

Call:

```
stsmFit(x = <S4 object of class structure("stsm", package = "stsm")>, stsm.method = "maxlik.td.opt",
  method = "L-BFGS-B", KF.version = "KFKSDS", KF.args = structure(list(P0cov = TRUE), .Names = "P0cov"),
  gr = "numerical")
```

Parameter estimates:

	LS29	var1	var2
Estimate	-247.8	16136	0
Std. error	11.7	2422	NaN

Log-likelihood: -633.0286

Convergence: 0

Number of iterations: 46 46

Variance-covariance matrix: optimHessian

Outliers:

```
      type ind time coefhat  tstat
1   LS   29 1899  -247.8 -21.17
```

Choose and fit an ARIMA model for the Nile time series checking for the presence detect possible outliers (additive outliers, level shifts or transitory changes):

```
> resNile2 <- tso(y = Nile, types = c("AO", "LS", "TC"),
+   maxit = 1, remove.method = "bottom-up", tsmethod = "auto.arima",
+   args.tsmethod = list(allowdrift = FALSE, ic = "bic"))
> resNile2
```

Series: Nile

ARIMA(0,0,0) with non-zero mean

Coefficients:

```
      intercept      LS29      A043
      1097.7500  -242.2289  -399.5211
s.e.    22.6783    26.7793   120.8446
```

sigma<sup>2</sup> estimated as 14401: log likelihood=-620.65

AIC=1249.29 AICc=1249.71 BIC=1259.71

Outliers:

```
      type ind time coefhat  tstat
1   LS   29 1899  -242.2 -9.045
2   AO   43 1913  -399.5 -3.306
```