

R Package `tsoutliers`

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February 2019

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:

<https://www.jalobe.com/blog/tsoutliers/> and

<https://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):

As of version 0.6-7 the experimental version for structural time series model is not available. Check previous versions of the package or contact the maintainer for details. For illustration, these are the results that were obtained in previous versions for the local level model.

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

```
Call:
structure(list(method = "L-BFGS-B"), .Names = "method")
```

```
Parameter estimates:
              LS29   var1   var2
Estimate    -247.78 16136     0
Std. error    11.71  1163   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 -21.16
Warning messages:
1: In sqrt(diag(solve(res$hessian))) : NaNs produced
2: In sqrt(diag(solve(res$hessian))) : NaNs produced
3: In sqrt(diag(solve(res$hessian))) : NaNs produced
4: In sqrt(diag(solve(res$hessian))) : NaNs produced
5: In sqrt(diag(solve(res$hessian))) : NaNs produced

```

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):

```

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

```

```

Series: Nile
Regression with ARIMA(0,0,0) errors

```

```

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

```

```

sigma^2 estimated as 14846:  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

```