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 = "stsm", args.tsmmodel = list(model = "local-level"))
    > resNile1$fit$call$xreg<-NULL
    > resNile1

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

Parameter estimates:

<table>
<thead>
<tr>
<th></th>
<th>LS29</th>
<th>var1</th>
<th>var2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimate</td>
<td>-247.78</td>
<td>16136</td>
<td>0</td>
</tr>
<tr>
<td>Std. error</td>
<td>11.71</td>
<td>1163</td>
<td>NaN</td>
</tr>
</tbody>
</table>

Log-likelihood: -633.0286
Convergence: 0
Number of iterations: 46 46
Variance-covariance matrix: optimHessian

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

```r
> 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     AO43
   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
```