finma
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IT Notes

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1 Purpose

This document is a guide for the installation of the R package *sstCalculation*.

2 Install R, Rstudio, Rtools and *sstCalculation*

This chapter explains the steps that are necessary to install the software programs (R, RStudio, Rtools) and the packages required to run *sstCalculation*.

2.1 Required software programs

Step 1

Please go to this link to install the software programs R and RStudio

https://posit.co/download/rstudio-desktop/

and follow the instructions or contact your IT department.

Step 2

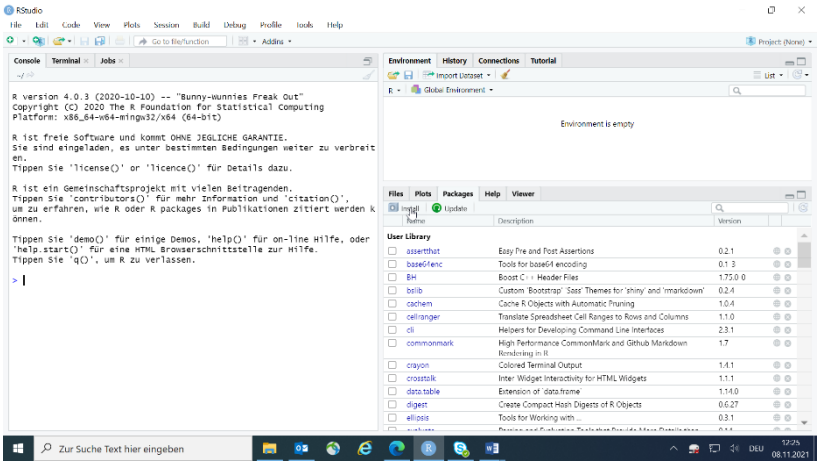
Use this link to install the software program Rtools

https://cran.r-project.org/bin/windows/Rtools/

2.2 Required R packages

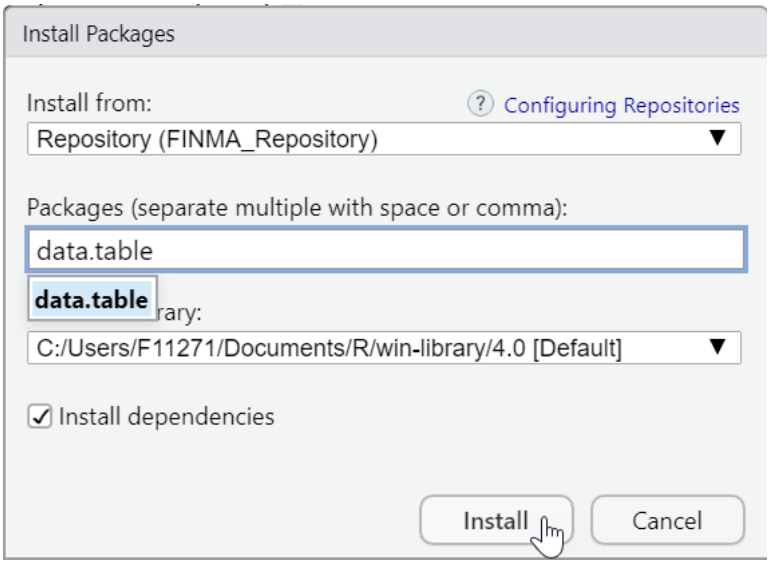
Step 1

Start RStudio. Select the tab *Packages* on the right and click on *Install*. A dialog box opens.

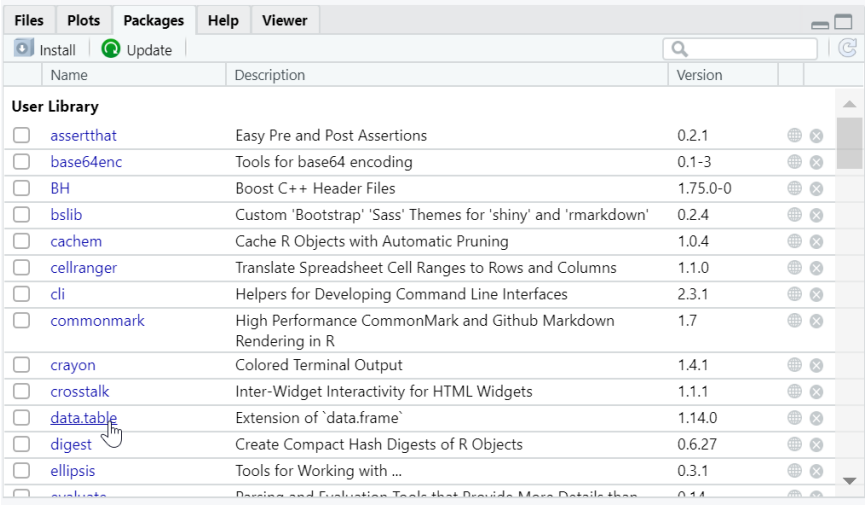


Step 2

Choose *Repository (CRAN)*, enter one of the required R packages and click on *Install* (the dialog box is shown for *data.table* in *FINMA_Repository*).



After successful installation, *data.table* appears in the list of packages of the user library.



Step 3

Repeat step 2 for the packages *readxl*, *openxlsx*, *MASS*, *shinydashboard*.

Step 4

Install *sstCalculation* according to section 3.2 in chapter 3.

3 R package *sstCalculation*

The R package *sstCalculation* for the calculation of the SST Ratio consists of the following programs:

1. the standalone R package *sstCalculation* itself
2. a GUI *Dashboard* started by a web browser.

The R package *sstCalculation* requires the programs R, RTools and RStudio as well as other R packages, as described in chapter 2.

3.1 System requirements

An Intel-compatible machine, with at least 4GB RAM. However, 8GB are recommended.

The *sstCalculation* R package is compatible and has been tested with Windows 7, Windows 8.1 and Windows 10. The *sstCalculation* R-package can also run on other Unix based operating systems supported by R. However, it has been designed only for the listed Windows versions.

3.1.1 Required software programs

The following software programs need to be pre-installed on the user's machine.

Software name	Minimum version
R	3.3.0
Rtools	3.4
RStudio	1.0.136

Remark: RStudio is necessary for launching the GUI.

3.1.2 Required R packages

The *sstCalculation* R package requires the following R packages to be installed in the user's R package library. Package names in italic are pre-installed within R.

Package name	Minimum version
data.table	1.10.4-3
readxl	1.0.0
openxlsx	4.0.17
MASS	None
shiny	1.0.5
shinydashboard	0.6.1
cellranger	None
Rcpp	0.11.6
tibble	1.1
httpuv	1.3.5
mime	0.3
jsonlite	0.9.16
xtable	None
digest	None
htmltools	0.3.5
R6	2.0
sourcetools	None
rematch	None
cli	None
crayon	None
pillar	None
rlang	None
assertthat	None
utf8	1.1.3

stats	-
utils	-
tools	-
methods	-
grDevices	-
graphics	-

3.2 Installation

Above software programs and R packages must be installed before the installation of the R package *sstCalculation*.

Step 1

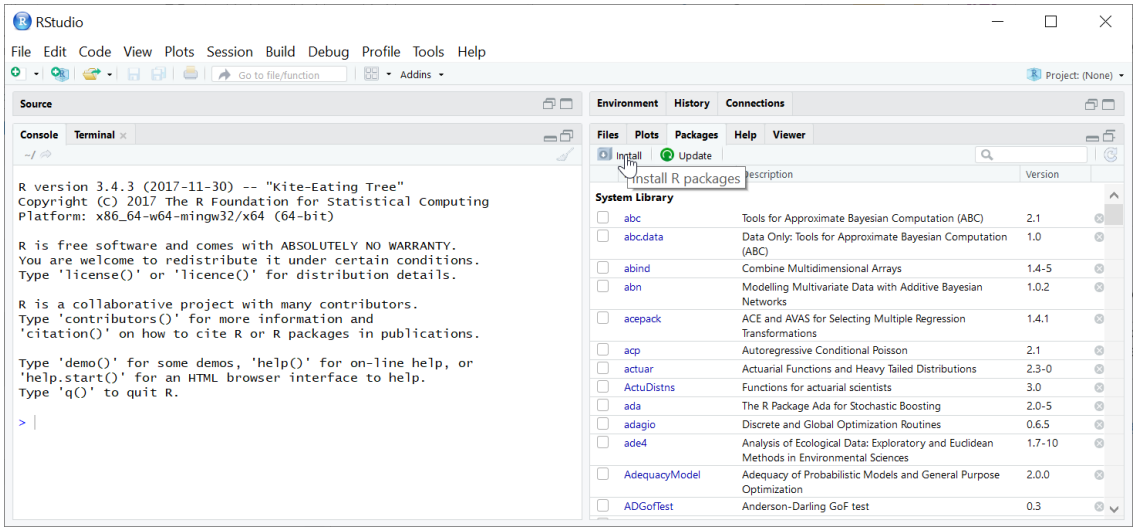
Download the archive *sstCalculation250tar.zip* from the FINMA Website here:

https://www.finma.ch/de/ueberwachung/versicherungen/spartenuebergreifende-instrumente/schweizer-solvenztest-sst/

Unzip the archive and store the R package *sstCalculation_2.5.0.tar.gz* on your local drive.

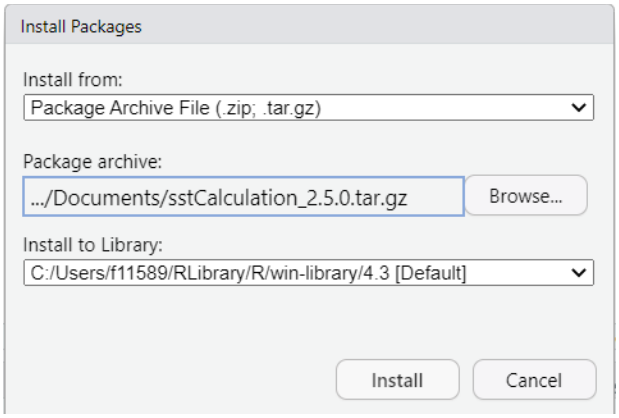
Step 2

Start RStudio. Select the tab *Packages* on the right and click on *Install*. A dialog box opens.



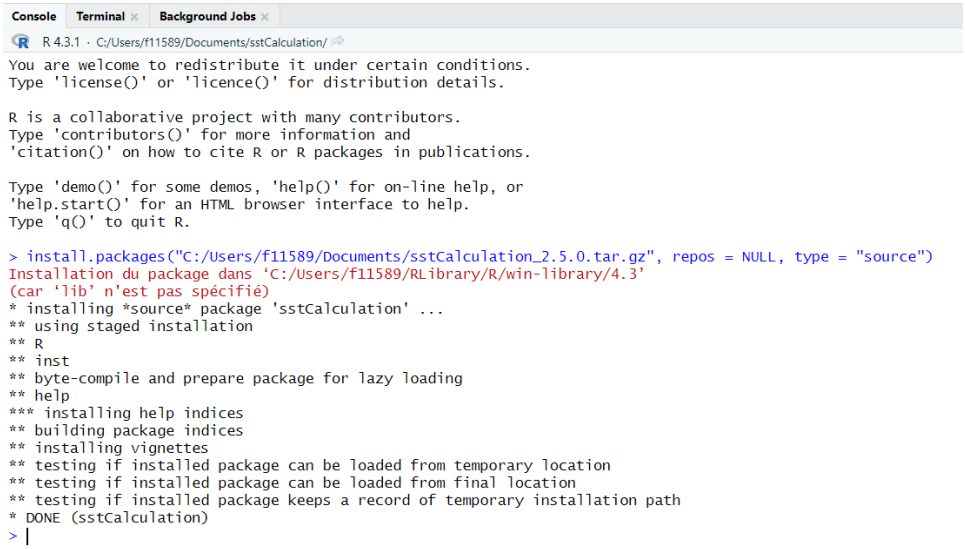
Step 3

Click on *Browse*, search for the R package *sstCalculation_2.5.0.tar.gz* on your local drive and click *Install* in the dialog box.



Step 4

Wait a moment. This feedback is displayed in the console down left.



The installation is completed successfully when everything is displayed in black. Otherwise, for system requirements please refer to above chapter.

Step 5

Enter the command *library(sstCalculation)* into the console to load the package.

```
> library(sstCalculation)
sstCalculation 2.5.0

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This program comes with ABSOLUTELY NO WARRANTY.
This is free software, and you are welcome to redistribute it
under certain conditions.

Type sstDashboard() and go to the 'Legal Notices' Tab for more details about the license.
Type sstIntroduction() to open an introduction to the sstCalculation package.
Type sstNews() to open an overview of the changes to the sstCalculation package.
```
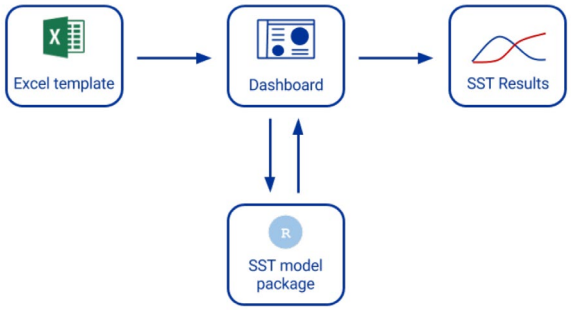

The GUI is started via the command *sstDashboard()*. The results are exported to the folder *Documents* by default. A different folder can be defined, see *?sstDashboard*.

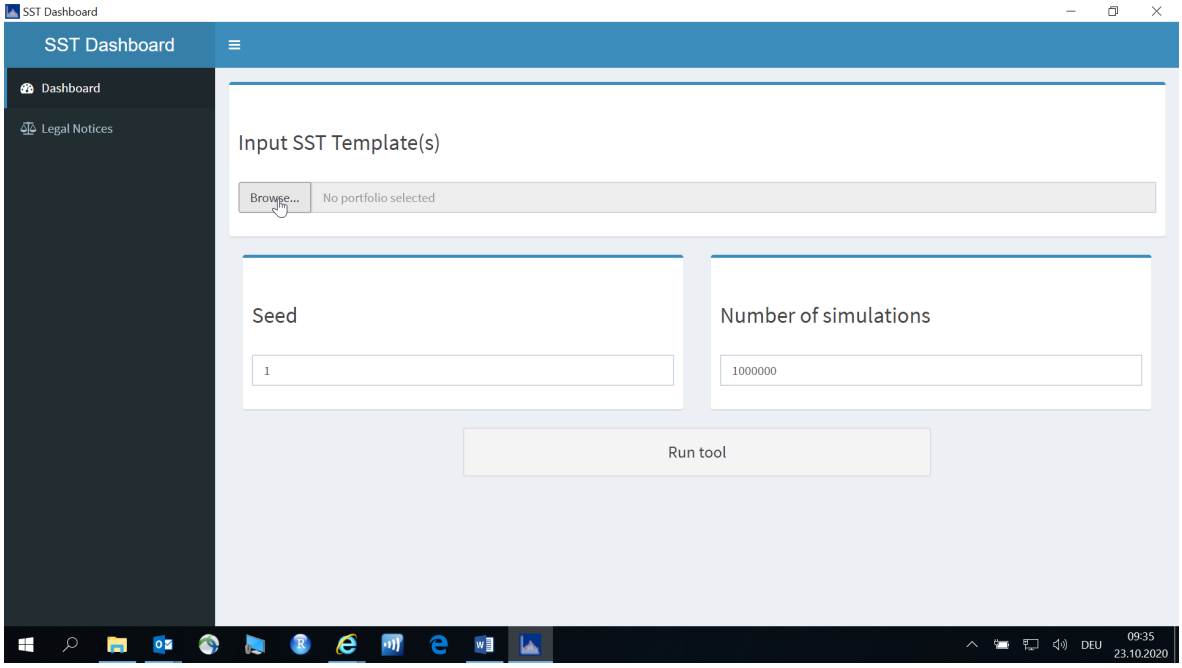
4 Run the Dashboard

The following picture shows the exchange between the Excel template, the SST dashboard and the R package.



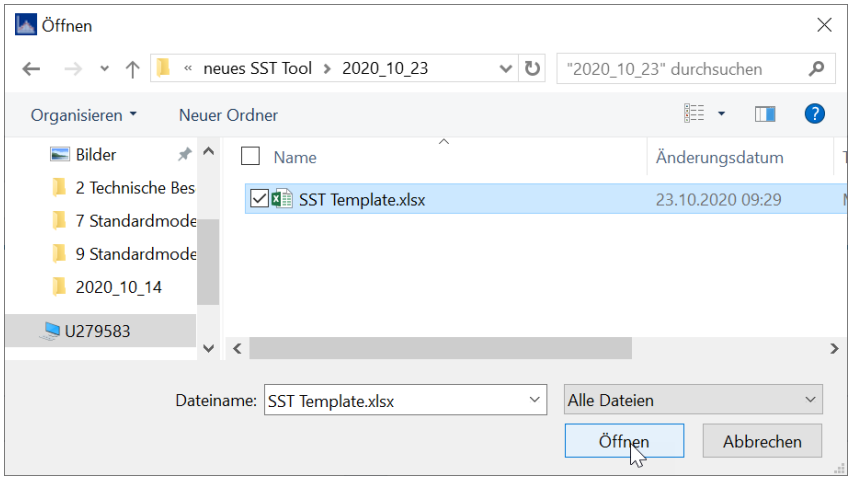
Step 1

The SST Dashboard is started and a browser opens with the dashboard. Click on Legal Notices for the legal notices related to the use and transfer of the package.



Step 2

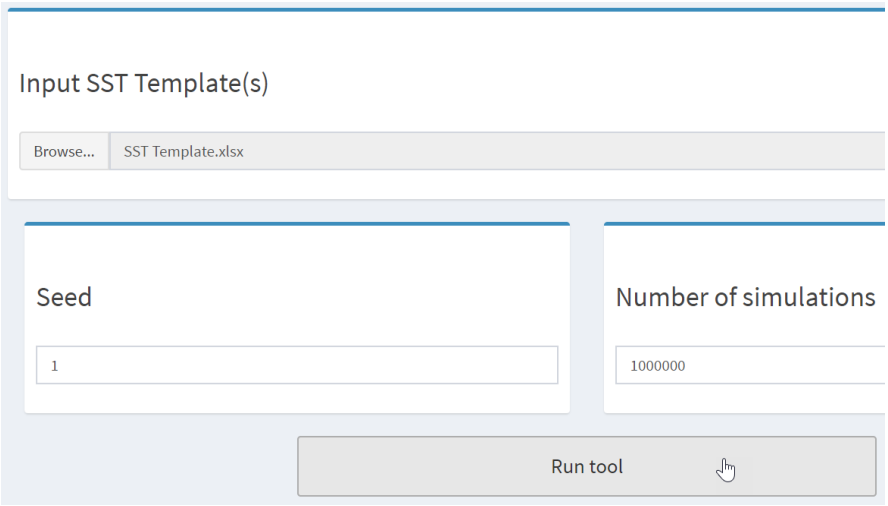
Upload the filled *SST Template*.



Users of the standard model for participations select all needed *SST Templates*.

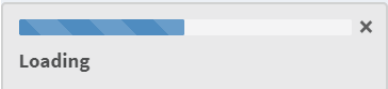
Step 3

Seed and number of simulations are loaded from the *SST Template*. Number of simulations for solvency calculation purposes should be 1 million. Click on *Run tool* to start the SST calculation.



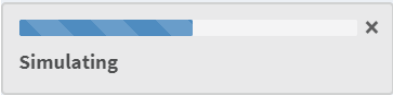
Step 4

The *SST Template* is parsed. Specific error messages are displayed in case any inputs are incomplete or incorrect.



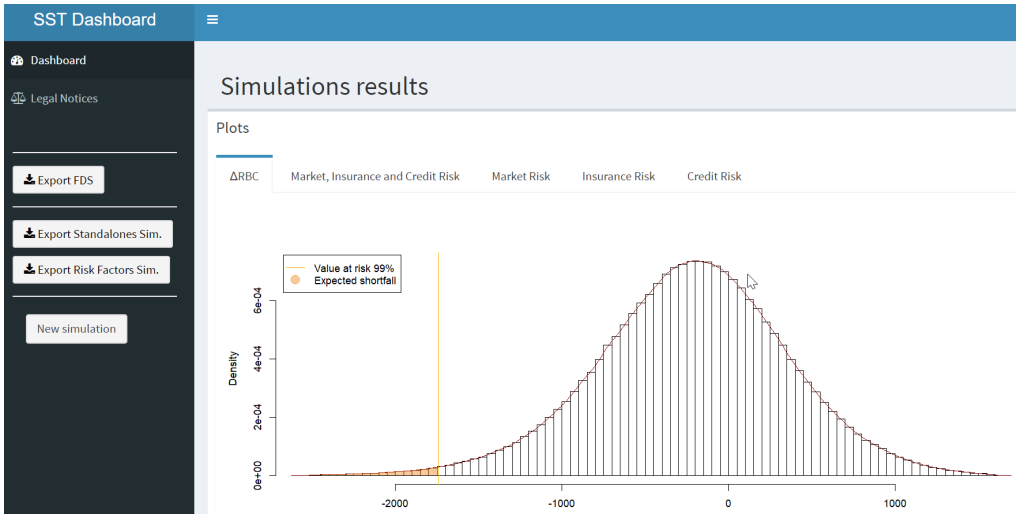
Step 5

The simulations for the calculation of the SST ratio are generated. This step can take a few minutes.



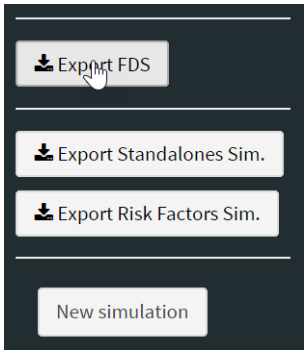
Step 6

Once the simulations are generated and the results for the *Fundamental Data Sheet* are calculated, a graphic is displayed on the screen showing the most important results and marginal distribution functions.



Step 7

Click on the box *Export FDS* to download the results for the *Fundamental Data Sheet*.



Step 8

An Excel file *Fundamental_Data.xlsx* containing the results is saved.