Install packages for stock synthesis benchmark

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1 Installation guidelines

1.1 Install FLR packages

1.1.1 Basic packages FLCore and ggplotFL

All FLR based packages are now available on r-universe (similar R cran), which means that for Windows users the packages are readily pre-compiled.

It is recommended to first install and test the two basic FLR packages FLCore and ggplot before proceeding with "heavier machinery"

Before installing the packages clear your R environment

```
rm(list = ls())
```

and re-start R.

```
install.packages(c("FLCore", "ggplotFL"), repo = "https://flr.r-universe.dev")
```

Load packages

```
library(FLCore)
library(ggplotFL)
```

1.2 Install FLBRP, FLFishery FLasher

- FLBRP solving for reference points in FLR
- FLasher forecasting (requires FLFishery)

both packages use C++ in the background.

Please ensure that FLash is not loaded before installing or using FLasher. There are many conflicts. Perhaps best to remove FLash.

```
install.packages(c("FLBRP", "FLFishery", "FLasher"), repo = "https://flr.r-universe.dev")
```

Load packages

```
library(FLBRP)
library(FLasher)
   Loading required package: FLFishery
   FLasher: Nocodemus awaits in vigil weeping
```

1.3 FLSRTMB, mse and FLRef

- FLSRTMB for stock-recruitment fitting in TMB
- mse many additional utilities and prerequisite for FLRef
- FLReffor advanced reference point estimation and producing advice plots

First, this needs some additional packages, first and foremost devtools and TMB

Note that it is recommended to install TMB from type = source, which will also be required for running spict. The installation of TMB required that Rtools is correctly installed (see above)!

```
install.packages("devtools")
install.packages("TMB", type = "source")
```

Furthermore, best to install the ggplot2 packages and reshape2

```
install.packages("ggplot2")
install.packages("reshape2")
```

Load packages

```
library(TMB)
library(ggplot2)
library(reshape2)
```

Now install FLSRTMB

```
install.packages(c("FLSRTMB"), repo = "https://flr.r-universe.dev")
```

Next install mse

```
install.packages(c("mse"), repo = "https://flr.r-universe.dev")
```

Load packages

```
library(FLSRTMB)
library(mse)
```

Install `FLRef`

```
install.packages(c("FLRef"), repo = "https://flr.r-universe.dev")
```

Load package

```
library(FLRef)
```

1.4 Install packages for Stock Synthesis

First in install `r4ss`, which is designed to load and evaluate ss3 models in R. It is recommended to install the latest version of `r4ss` directly from github.

```
devtools::install_github("r4ss/r4ss")
```

In addition, it is suggest to install the `FLR` package `ss3om`, which is needed to produce the partial F plot by gear/fleet

```
install.packages(c("ss3om"), repo = "https://flr.r-universe.dev")
```

1.4.1 FishLife

Let's install:

FishLife, which helps us to retrieve life-history estimates.

Consider to update the rfishbase version. During the process of installing the package you may be asked for. Please update it as needed.

```
# remotes::install_github('ropensci/rfishbase')
library("rfishbase")
```

```
   Attaching package: 'rfishbase'
   The following object is masked from 'package:FLCore':

       distribution
```

You might face issues installing this package. Please run the below code before installing FishLife

```
options(download.file.method = "wininet")
```

The final step is confirming the package is properly installed by calling it. You should find the below loading information in your console

Loading package FishLife, developed by James Thorson for the National Marine Fisheries Service For details and citation guidance, please see http://github.com/James-Thorson-NOAA/FishLife/

You also can retrieve the *vignettes* to access the predictive values by running FishLife. To retrieve the PDF please click in the ZIP folder and follow the path: **FishLife-3.1.0/vignettes/Access.pdf/**

Please note that a number of papers describing models, databases, and applications for stock assessment may be found under several headlines Description of package, Further reading, and Applications for stock assessment.

```
# devtools::install_github('james-thorson/FishLife',
# dep=TRUE)
library(FishLife)
```

```
   ##############################################################################################
   Loading package FishLife, developed by James Thorson for the National Marine Fisheries Service
   For details and citation guidance, please see http://github.com/James-Thorson-NOAA/FishLife/
   ##############################################################################################
```

1.4.2 SPMpriors

SPMpriors, which provide a toolbox for generating priors for stock assessments from FishLife. Accordingly, *SPMpriors* should be installed after *FishLife* was. Note that the 'force' mode is being used in order to make sure *SPMpriors* is installed and updated later than *FishLife* is.

```
# devtools::install_github('henning-winker/SPMpriors',force
# = TRUE)
library(SPMpriors)
```