DATA501 Testing Plan - ordpatt2

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The *ordpatt2* package is based on the *StatOrdPattHxC* package written by Andrea Rey and Alejandro Frery. Currently, it combines the three separate entropy functions and the Fisher Information function into one function and adds a plotting option to the *OPprob* function. This has been renamed *OPprob2*. Eventually, it will also improve on some of the slower functions from *StatOrdPattHxC* .

The *ordpatt2* GitHub repository contains the internal *perm* and *pi_i* functions rewritten in C++ in the src folder, but they do not interact properly with the R functions yet when packaged up, so they have not been included in this round of testing. The original .R functions from *StatOrdPattHxC* have been included instead. It also includes several other .R functions from *StatOrdPattHxC* required for the running of *OPprob2*. None of these functions will be tested.

If you run into any issues when installing or testing, please email me at isgauper@gmail.com.

Please follow the steps below to complete the testing. At each step, please note any issues that occur or any suggestions for improvement.

1. Install the package

   Use the following code to install the package via GitHub, including test files and vignettes:

   ```
   remotes::install_github("https://github.com/isgauper/ordpatt2",
   INSTALL_opts = c("--install-tests"),build_vignettes = TRUE)
   ```

   For the testthat portion of the testing plan, the package *StatOrdPattHxC* will need to be installed and loaded. This can be done with the following code:

   ```
   remotes::install_github("https://github.com/arey1911/StatOrdPattHxC")
   ```

You may want to enter "3" to skip updates. The *testthat* package will also need to be installed and loaded.

2. Explore vignettes. Run examples

   Run the following code to bring up the vignettes:

   ```
   browseVignettes("ordpatt2")
   ```

   Click on both html links listed. Run the code provided in each vignette.

3. Run testing files using testthat

   Run the following code to run the unit tests.

   ```
   test_path <- system.file("tests", package = "ordpatt2")
   testthat::test_dir(test_path)
   ```

   This runs two testing files: *test-entropy2.R* and *test-OPprob2.R*. These files test whether outputs from the*ordpatt2* functions match outputs from the relevant functions in *StatOrdPattHxC*. It also tests for expected output types and whether certain inputs return an error.

4. Test out the *OPprob2* function

   Test the functionality of the *OPprob2* function by running various tests of your choice.

   OPprob2 takes a time series and a numeric embedding dimension (example emb=3, emb = 4) as input. Try running it with the *lynx* or the *sunspots* time series included in base R, or another time series of your choice, .

   Here are some other possible tests to run:

   - check that the output is numeric
   - with a dataframe or list as input
   - with negative embedding dimensions
   - with plot(OPprob2(...))
   - with a time series that contains NAs or other missing values
   - compare the results with the *OPprob* function from the *StatOrdPattHxC* package.

5. Test out the *entropy* function

   Test the functionality of the *entropy* function by running various tests of your choice.

The *entropy* function takes p, a sequence of ordinal pattern probabilities, and a method as input. The possible methods are "Fisher", "Shannon", "Renyi" and "Tsallis". *OPprob2* can be used on a time series to generate the required p input. See the vignette for examples.

Here are some other possible tests to run:

- compare results from the equivalent *StatOrdPattHxC* functions. These are *HFisher, HShannon, HTsallis* and *HRenyi*.
- with a sequence of probabilities, p, that do not sum to 1.
- with a sequence of probabilities that contain NAs, other missing values or negative values
- with an incorrect method as input
- check that the output with [1] is numeric, e.g.

```
ShEnt <- entropy(p,"Shannon")
class(ShEnt[1])
```