

Notes on **rwm**

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Abstract

The **rwm** package implements the most important workspace management functions that are available in APL. This is especially useful in ephemeral computing projects such as arise in decision support, teaching and homework assignments. In these situations, it is often important to do some computations to obtain a result such as, for example, the best lowest cost alternative or the solution of a homework problem. In these cases using workspaces may be simpler and more expedient than working with R libraries.

Keywords: APL Commands, decision support systems, ephemeral computing, workspace, teaching.

1. Introduction and Purpose

I used APL extensively at one time and occasionally still do. I found the APL commands, *)LOAD*, *)SAVE*, *)LIB*, *)LOAD* and *)WSID*, very convenient and useful for managing APL workspaces and libraries. The purpose of these commands is briefly described in the table below:

APL COMMAND	BRIEF DESCRIPTION
<i>)LOAD</i>	load a previously saved workspace
<i>)SAVE EG</i>	save workspace and change its WSID to “EG”
<i>)SAVE</i>	save workspace using its WSID-name
<i>)LIB</i>	make objects in a previously save workspace accessible
<i>)CONTINUE</i>	save workspace and quit
<i>)CLEAR</i>	clear workspace and change its WSID to “CLEARWS”
<i>)WSID EG</i>	set WSID to “EG”
<i>)WSID</i>	display the WSID

Since switching first to **S** in 1990 and later on to **S-Plus** and now to **R**, I have continued to use an implementation of these APL-like commands. More than ever this seems a natural and effective way to work with **R**.

The functions provided in **rwm** may be used in interactive or batch mode with **R** and across all operating systems. In these way **R** scripts, accessing a variety of user created workspaces, may be easily be made portable across all these environments. As discussed in [McLeod \(2009\)](#), workspaces may provide an expedient and reliable alternative to packages in ephemeral computing situations such in teaching and decision support.

R also shares with **APL** the idea of vectorizing the computations. In a separate vignette

([McLeod 2009](#)), included with this package, I discuss some of the common functions for vector thinking in APL, Mathematica and R. Please note that this is a digression and not directly relevant to the **rwm** package.

2. Setup

The *installation directory* is where R and its component directories: **bin**, **library**, etc. are located. The location of this directory is often referred to as **R_HOME** and this location is typically stored by the OS in an environmental variable. When R is running the location **R_HOME** may be obtained using the function **R.home**:

```
R.home()
```

When R is started using the executable program located in the **bin** subdirectory of **R_HOME**, the default initial working directory (IWD) is used. The location of this default IWD may be determined using the R function **getwd**.

OS	Default IWD
Windows Vista	C:\Users\Ian\R
Mac OS X	/users/aim/R
linux	/users/faculty/aim/R

When the R workspace is saved using the function **save.image**, a workspace file with extension **.Rdata** is created in the current working directory,

```
save.image()
```

By default, this extension is the filename as well which means that most OSs the resulting file is *hidden*. But a full name could also be specified as in:

```
save.image("MyWS.Rdata")
```

When using the GUI interface to R, another way of starting R is simply to click on the workspace.

For more details about starting R, see [Venables, Smith, and R Development Core Team \(2009, Appendix B\)](#).

2.1. Suggested Setup

```
.UserDirectory <- "d:/r/2009"
.UserDate <- "2009"
dir.create(paste(.UserDirectory, .UserDate, sep="/"))
save.image()
```

2.2. Generic Setup

For some purposes we need a directory assignment that is completely machine and OS independent. The following initializes the setup variables for **rwm** and then saves the workspace. If you are using a OS/GUI such as with Windows or Mac, you could simply drag the saved workspace to the desktop and then start R by clicking on the icon for the workspace.

```
R> .UserDirectory <- tempdir()
R> .UserData <- "2009"
R> dir.create(paste(.UserDirectory, .UserData, sep = "/"))
R> library(rwm)
```

Current directory: C:/Users/Ian/AppData/Local/Temp\Rtmp2oCWjh

```
R> save.image("GenericExample")
```

3. Workspace Functions

FUNCTION	BRIEF DESCRIPTION
<code>loadws</code>	load a previously saved workspace
<code>attachws</code>	attach a previously saved workspace
<code>savews</code>	save workspace
<code>cws</code>	save workspace and quit or clear
<code>clearws</code>	clear workspace and return to home

These functions all have counterparts in the APL. The function `loadws` is similar to the APL command `)LOAD`. If the optionally argument `pos` is set to an integer bigger than 2, `loadws` attaches the workspace in that position in the search path and in this case its behavior is similar to the APL command `)LIB`.

The functions `savews`, `cws` and `clearws` are reminiscent of the APL commands `)SAVE`, `CONTINUE` and `)CLEAR`. For more about these APL commands see [Grenander \(1982\)](#); [Helzer \(1989\)](#) or any of the other books on the APL programming language.

The APL command `)DROPWS` is not implemented. In **rwm**, each workspace is usually saved in a separate directory. There is a possibility of confusion over whether the whole directory should be deleted or just the specified workspace. it is safer for the user to delete unneeded workspaces and/or directories manually using the methods available in the OS.

4. Working With Multiple IWDs

Sometimes when working with **Mathematica** or **L^AT_EX**, I find it convenient to save R workspaces along with these project files. This could be done by using the base R function `save.image` but it is easy to make an error in the pathname. So I find it convenient to use the function `SelectUserDirectory` to set up a different initial workspace. Of course, the user will likely need to modify the locations to suit their needs.

```
`SelectUserDirectory` <-
function(){
```

```

cat("Select from the following:", fill=T)
cat("1. d:/r", fill=T)
cat("2. d:/math", fill=T)
cat("3. e:/tex", fill=T)
cat("4. R home", fill=T)
ans <- as.numeric(readline("Enter your choice 1-4: \n"))
if (! (ans %in% 1:4)) ans<-4 #default, always valid
.UserDirectory <- switch(ans, "d:/r", "d:/math", "e:/tex", R.home())
setwd(.UserDirectory)
cat(paste("Current directory:", .UserDirectory), fill = TRUE)
}

```

5. Using Workspaces like Packages

6. Clearing the Workspace

References

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