1 setRNG Functions

In R, the functions in this package are made available with

```
> library("setRNG")
```

This library provides tools to simplify recording and resetting the random number generator, to help make monte carlo experiments easily reproducible. It uses the R/S tools for setting the seed, but also records and sets the mechanism for converting uniform numbers to normally distributed numbers. (It could be extended to other transformations, but I have not done that.)

The setRNG function would typically be called by simulation programs. For example, if *rng=NULL* is an argument to the function then the code

```
> if (!require("setRNG")) {
      stop("This function requires the setRNG package.")
  }
> if (is.null(rng)) rng <- setRNG() else {
      old.rng <- setRNG(rng)
      on.exit(setRNG(old.rng))
  }
```

should be used before the random number generator is used. This will set the RNG information if given, and in all cases record the RNG information which can then be returned with the result of the simulation. (*setRNG()* returns the setting so do not skip this if *rng=NULL*.) With the information recorded the simulation can always be reproduced if necessary. In the case where the rng is set to a specified value it is good practice to set it back to the original value on exit. This prevents other random experiments from accidentally being affected by the rng setting.

The library also implements an approach to random number generation which allows the same random experiments to be replicated in S and R. The functions in the S directory allow the R results using Wichmann-Hill and Box-Muller to be replicated in S. These were done with the aid of an example from B. D. Ripley. (The files in the S directory of the package are for use with S not R.) These functions are intended primarily as a way to confirm that simulations and estimations with simulated data work in the same way in both S and R, not as an improved RNG. (It has only been tested in Splus 3.3) Default and other RNGs can still be used and are preferred for both speed and theoretical reasons.