Calling Fortran from Splus

An Example of the Splus Interface Function

In the file `mgs.S` is the following Splus function:

```
mgs <- function(X)
#-----------------------------------------------
#
#   Function to interface between S-Plus and Fortran
#   to get a modified Gram-Schmidt decomposition.
#
#-----------------------------------------------
{

  n  <- dim(X)[1]
  m  <- dim(X)[2]

  zz <- .Fortran("mgs",
                 Q=as.double(X),
                   as.integer(n),
                   as.integer(m),
                   as.integer(n),
                   as.integer(m),
                 R=as.double(rep(0,m*m)),
                 D=as.double(rep(0,m)),
               ier=as.integer(0))

  return(list(Q=matrix(zz$Q,n,m),R=matrix(zz$R,m,m),D=zz$D,ier=zz$ier))

}
```

The Fortran Subroutine Calling Sequence

In the file `6041.f` is the following code:

```
       subroutine MGS(X,n,m,ndim,mdim,R,d,ier)
c***********************************************************************
c
c   Subroutine to find Modified Gram-Scmidt Decomposition X=QR of an
c   n by m matrix X.
c
c   Input:  X, n, m
c           ndim, mdim: row dimension of X and R in calling program
c
c   Output: X: contains Q
c           R
c           d: vector containing diagonal elements of Q transpose Q
c           ier: 0 (1) means X is (is not) nonsingular
c
c   Subprograms called: double precision function dbprod
c
c***********************************************************************

        double precision X(ndim,1),R(mdim,1),d(1)
        double precision dbprod,eps
```

How to Use the Fortran from Splus

```
> source('mgs.S')        # Doesn't have to be done everytime

> dyn.open('604l.o')     # Must be done everytime you start Splus

> X  <- matrix(rnorm(15),5,3)
> XX <- mgs(X)

> XX
$Q:
            [,1]       [,2]         [,3]
[1,]  0.85878535  0.6320799 -1.042982133
[2,] -0.02228378 -0.7323190 -0.329918311
[3,] -0.25086208  0.2369041 -0.783902595
[4,]  1.21430467  1.0752487  0.565597324
[5,]  1.35499256 -1.3323978  0.003606707

$R:
     [,1]       [,2]       [,3]
[1,]    1 -0.6175539 -0.0178111
[2,]    0  1.0000000  0.5808680
[3,]    0  0.0000000  1.0000000

$D:
[1] 4.111481 3.923383 2.131074

$ier:
[1] 0

> max(abs(X - XX$Q %*% XX$R))
[1] 1.110223e-16
```