Stat 8311, QR Decomposition in R

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  Natural language support but running in an English locale

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Type 'demo()' for some demos, 'help()' for on-line help, or
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Type 'q()' to quit R.

[Previously saved workspace restored]

> invisible(options(echo = TRUE))
> #QR factorization
> set.seed(121)
> a <- matrix(rnorm(15),ncol=3)
> decomp <- qr(a)
> decomp
$qr
          [,1]        [,2]        [,3]
[1,]  0.7805122 -1.2177629 -1.0834362
[2,] -0.1388508 -1.8060323 -1.0152347
[3,] -0.1637137  0.1615833  1.1327304
[4,]  0.1038721 -0.7316274  0.4702360
[5,]  0.9143787 -0.5749423  0.8732727

$rank
[1] 3

$qraux
[1] 1.327170 1.328715 1.127565

$pivot
[1] 1 2 3

attr(,"class")
[1] "qr"
> qr.Q(decomp)
          [,1]        [,2]         [,3]
[1,] -0.3271704 -0.67380641  0.321572949
[2,]  0.1388508 -0.25822016 -0.859150062
[3,]  0.1637137 -0.07846555 -0.267621828
[4,] -0.1038721  0.67889140  0.009479089
[5,] -0.9143787  0.11071086 -0.294517765
> qr.R(decomp)
```

```
             [,1]       [,2]        [,3]
[1,] 0.7805122 -1.217763 -1.083436
[2,] 0.0000000 -1.806032 -1.015235
[3,] 0.0000000  0.000000  1.132730
> y <- rnorm(5)
> qr.qty(decomp,y)
[1] -0.6712659 -1.1214074  1.0996545 -1.5278725 -0.9903005
> qr.fitted(decomp,y)
[1]  1.3288490 -0.7484040 -0.3161951 -0.6811643  0.1657715
> qr.resid(decomp,y)
[1] -0.3281202 -0.7206273  1.5319293 -0.4775748  0.3365084
> qr.coef(decomp,y)
[1] 0.60487495 0.07520226 0.97079984
> decomp <- qr(a[,c(1,1,2,3)])
> decomp
$qr
            [,1]        [,2]        [,3]          [,4]
[1,]  0.7805122 -1.2177629 -1.0834362  7.805122e-01
[2,] -0.1388508 -1.8060323 -1.0152347 -4.561836e-18
[3,] -0.1637137  0.1615833  1.1327304 -1.145620e-17
[4,]  0.1038721 -0.7316274  0.4702360 -6.366947e-18
[5,]  0.9143787 -0.5749423  0.8732727  1.324131e-01

$rank
[1] 3

$qraux
[1] 1.327170 1.328715 1.127565 1.991195

$pivot
[1] 1 3 4 2

attr(,"class")
[1] "qr"
> qr.fitted(decomp,y)
[1]  1.3288490 -0.7484040 -0.3161951 -0.6811643  0.1657715
> qr.resid(decomp,y)
[1] -0.3281202 -0.7206273  1.5319293 -0.4775748  0.3365084
> qr.Q(decomp)
            [,1]        [,2]         [,3]        [,4]
[1,] -0.3271704 -0.67380641  0.321572949  0.4506468
[2,]  0.1388508 -0.25822016 -0.859150062  0.4075997
[3,]  0.1637137 -0.07846555 -0.267621828 -0.4705245
[4,] -0.1038721  0.67889140  0.009479089  0.5887682
[5,] -0.9143787  0.11071086 -0.294517765 -0.2504768
> round(t(qr.Q(decomp)) %*% qr.Q(decomp),5)
     [,1] [,2] [,3] [,4]
[1,]    1    0    0    0
[2,]    0    1    0    0
[3,]    0    0    1    0
[4,]    0    0    0    1
>
> proc.time()
[1] 0.60 0.04 0.73 0.00 0.00
>
```