

Reconstrucción práctica de una matriz, con S-Plus.

```
> J1  Matriz de datos X
```

	[,1]	[,2]	[,3]
[1,]	58	116	178
[2,]	45	79	125
[3,]	55	98	162
[4,]	51	92	141
[5,]	51	87	136
[6,]	55	99	156
[7,]	46	85	137
[8,]	45	79	126
[9,]	45	80	135
[10,]	53	98	158
[11,]	45	74	103
[12,]	46	85	132
[13,]	53	93	143
[14,]	44	90	153
[15,]	52	94	148
[16,]	46	89	148
[17,]	53	92	143
[18,]	50	96	154
[19,]	52	91	152
[20,]	50	76	127

```
> J2          X'X
```

	[,1]	[,2]	[,3]
[1,]	49835	89825	143042
[2,]	89825	162549	258949
[3,]	143042	258949	413197

```
> eigen(J2)      Autodescomposición de la matriz X'X: vector u
$values:
[1] 625144.4641    334.8611    101.6748
```

```
> Peu1          > Peu2          > Peu3
$vector:
      [,1]      [,2]      [,3]
[1,] 0.2817030 -0.7525292  0.5952673
[2,] 0.5097409 -0.4082291 -0.7573066
[3,] 0.8129008  0.5167676  0.2685955
```

```

> J3  XX'
      [,1] [,2] [,3] [,4] [,5] [,6] [,7] [,8] [,9] [,10]

[1,] 48504 34024 43394 38728 37258 42442 36914 34202 35920 42566
[2,] 34024 23891 30467 27188 26168 29796 25910 24016 25220 29877
[3,] 43394 30467 38873 34663 33363 37999 33054 30629 32185 38115
[4,] 38728 27188 34663 30946 29781 33909 29483 27329 28690 33997
[5,] 37258 26168 33363 29781 28666 32634 28373 26304 27615 32717
[6,] 42442 29796 37999 33909 32634 37162 32317 29952 31455 37265
[7,] 36914 25910 33054 29483 28373 32317 28110 26047 27365 32414
[8,] 34202 24016 30629 27329 26304 29952 26047 24142 25355 30035
[9,] 35920 25220 32185 28690 27615 31455 27365 25355 26650 31555
[10,] 42566 29877 38115 33997 32717 37265 32414 30035 31555 37377
[11,] 29528 20746 26413 23626 22741 25869 22471 20849 21850 25911
[12,] 36024 25285 32244 28778 27693 31537 27425 25417 26690 31624
[13,] 39316 27607 35195 31422 30242 34430 29934 27750 29130 34517
[14,] 40226 28215 36026 32097 30882 35198 30635 28368 29835 35326
[15,] 40264 28266 36048 32168 30958 35254 30658 28414 29840 35352
[16,] 39336 27601 35228 31402 30217 34429 29957 27749 29170 34544
[17,] 39200 27528 35097 31330 30155 34331 29849 27671 29050 34419
[18,] 41448 29084 37106 33096 31846 36278 31558 29238 30720 36390
[19,] 40628 28529 36402 32456 31241 35581 30951 28681 30140 35690
[20,] 34322 24129 30772 27449 26434 30086 26159 24256 25475 30164

      [,11] [,12] [,13] [,14] [,15] [,16] [,17] [,18] [,19] [,20]

[1,] 29528 36024 39316 40226 40264 39336 39200 41448 40628 34322
[2,] 20746 25285 27607 28215 28266 27601 27528 29084 28529 24129
[3,] 26413 32244 35195 36026 36048 35228 35097 37106 36402 30772
[4,] 23626 28778 31422 32097 32168 31402 31330 33096 32456 27449
[5,] 22741 27693 30242 30882 30958 30217 30155 31846 31241 26434
[6,] 25869 31537 34430 35198 35254 34429 34331 36278 35581 30086
[7,] 22471 27425 29934 30635 30658 29957 29849 31558 30951 26159
[8,] 20849 25417 27750 28368 28414 27749 27671 29238 28681 24256
[9,] 21850 26690 29130 29835 29840 29170 29050 30720 30140 25475
[10,] 25911 31624 34517 35326 35352 34544 34419 36390 35690 30164
[11,] 18110 21956 23996 24399 24540 23900 23922 25216 24730 20955
[12,] 21956 26765 29219 29870 29918 29217 29134 30788 30191 25524
[13,] 23996 29219 31907 32581 32662 31879 31814 33600 32955 27879
[14,] 24399 29870 32581 33445 33392 32678 32491 34402 33734 28471
[15,] 24540 29918 32662 33392 33444 32662 32568 34416 33754 28540
[16,] 23900 29217 31879 32678 32662 31941 31790 33636 32987 27860
[17,] 23922 29134 31814 32491 32568 31790 31722 33504 32864 27803
[18,] 25216 30788 33600 34402 34416 33636 33504 35432 34744 29354
[19,] 24730 30191 32955 33734 33754 32987 32864 34744 34089 28820
[20,] 20955 25524 27879 28471 28540 27860 27803 29354 28820 24405

```

```
> eigen(J3) Autodescomposición de la matriz XX': vector v
$values:
```

```
        6.251445e+005    3.348611e+002    1.016748e+002
        5.088331e-011    6.981208e-012    5.939841e-012
```

```
>Pev1      > Pev2      > Pev3
$vector:
```

	[,1]	[,2]	[,3]
[1,]	0.2784570	-0.05373856	0.54664700
[2,]	0.1954805	0.08295200	-0.05298312
[3,]	0.2493335	-0.12682526	-0.20192926
[4,]	0.2224494	0.16786664	0.14296813
[5,]	0.2140853	0.19752326	-0.09936652
[6,]	0.2438094	0.06492262	0.03299958
[7,]	0.2120425	-0.08095168	0.01895953
[8,]	0.1965086	0.05471211	-0.07962053
[9,]	0.2064065	-0.17713830	-0.24425293
[10,]	0.2445084	-0.09611288	0.02268926
[11,]	0.1696382	0.59268669	0.15751831
[12,]	0.2069019	0.06024775	0.15214661
[13,]	0.2258629	0.21594260	0.04672878
[14,]	0.2310035	-0.50349423	0.08635146
[15,]	0.2312920	0.05592815	0.04768048
[16,]	0.2259308	-0.30235618	0.02636533
[17,]	0.2252182	0.19363404	-0.02837556
[18,]	0.2380376	-0.15114122	0.15613353
[19,]	0.2334704	-0.12395708	-0.28418222
[20,]	0.1973841	0.16516447	-0.62674313

```
<(sqrt(625144.46)*Pev1%*%t(Pev1)
Reconstrucción de X con un grado
```

	[,1]	[,2]	[,3]
[1,]	62.00779	112.20395	178.9355
[2,]	43.52127	78.75234	125.5891
[3,]	55.52637	100.47573	160.2321
[4,]	49.53496	89.63419	142.9427
[5,]	47.66404	86.24872	137.5438
[6,]	54.30136	98.25906	156.6971
[7,]	47.21858	85.44266	136.2584
[8,]	43.76628	79.19567	126.2961
[9,]	45.97129	83.18569	132.6591
[10,]	54.45727	98.54118	157.1470
[11,]	37.77486	68.35413	109.0067
[12,]	46.08266	83.38720	132.9805
[13,]	50.29224	91.00450	145.1280
[14,]	51.45043	93.10026	148.4702
[15,]	51.49498	93.18087	148.5987
[16,]	50.31451	91.04480	145.1923
[17,]	50.15860	90.76268	144.7424
[18,]	53.00954	95.92148	152.9693
[19,]	51.98498	94.06753	150.0127
[20,]	43.94446	79.51810	126.8103

$\sqrt{625144.46} \cdot \text{Pev1} \% t(\text{Peu1})$
 $+ \sqrt{334.86} \cdot \text{Pev2} \% t(\text{Peu2})$
 Reconstrucción de X con dos grados

	[,1]	[,2]	[,3]
[1,]	61.26834	111.80282	179.4433
[2,]	44.66282	79.37158	124.8052
[3,]	53.78032	99.52857	161.4310
[4,]	51.84559	90.88761	141.3562
[5,]	50.38364	87.72400	135.6764
[6,]	55.19505	98.74385	156.0835
[7,]	46.10457	84.83836	137.0233
[8,]	44.51950	79.60427	125.7789
[9,]	43.53260	81.86280	134.3336
[10,]	53.13396	97.82334	158.0557
[11,]	45.93504	72.78069	103.4035
[12,]	46.91162	83.83688	132.4113
[13,]	53.26521	92.61721	143.0866
[14,]	44.51855	89.34000	153.2299
[15,]	52.26473	93.59842	148.0702
[16,]	46.15180	88.78670	148.0506
[17,]	52.82450	92.20882	142.9119
[18,]	50.92887	94.79280	154.3980
[19,]	50.27886	93.14204	151.1842
[20,]	46.21791	80.75135	125.2492

$\sqrt{625144.46} \cdot \text{Pev1} \% t(\text{Peu1})$
 $+ \sqrt{334.86} \cdot \text{Pev2} \% t(\text{Peu2}) +$
 $\sqrt{101.67.86} \cdot \text{Pev3} \% t(\text{Peu3})$
 Reconstrucción de X con tres grados

	[,1]	[,2]	[,3]
[1,]	57.98792	115.97665	177.9634
[2,]	44.98030	78.96764	124.9485
[3,]	54.99202	97.98687	161.9777
[4,]	50.98798	91.97879	140.9693
[5,]	50.97959	86.96574	135.9453
[6,]	54.99760	98.99507	155.9944
[7,]	45.99115	84.98268	136.9721
[8,]	44.99722	78.99645	125.9944
[9,]	44.99817	79.99809	134.9947
[10,]	52.99833	97.99592	157.9945
[11,]	44.98981	73.98335	102.9771
[12,]	45.99879	84.99831	131.9995
[13,]	52.98494	92.97381	142.9602
[14,]	44.00062	89.99898	152.9963
[15,]	51.97906	93.96189	147.9413
[16,]	45.99396	88.98753	147.9794
[17,]	52.99434	91.99272	142.9885
[18,]	49.99204	95.98478	153.9754
[19,]	51.98389	90.97266	151.9534
[20,]	49.97904	75.96589	126.9459