Subject: Re: Covariance Matrix
Posted by amin farhang on Sat, 07 Dec 2013 14:37:38 GMT
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Hi David,

Indeed there is no any B vector in my problem. In statistical notes, for computing the covariance of a vector the following formula can be used:

cov(A,A) = E[(A-EA)*(A-EA)^T]

where E means expected value, EA is the mean value of A vector and T means transpose of A vector. I write a code for this (A is a column vector):

```
s = size(A)
Na = s[2]
MeanValue = total(A)/float(Na)
AT = transpose(A)
A = A - MeanValue
AT = AT - MeanValue
covariance = A ## AT
```

for example for A=[1,2,3,4] the covariance matrix with above code become:

```
 2.25000     0.750000    -0.750000    -2.25000
0.750000     0.250000    -0.250000    -0.750000
-0.750000    -0.250000     0.250000     0.750000
-2.25000    -0.750000     0.750000     2.25000
```

but the weird thing is that if we divide the covariance matrix by standard deviation of A and AT we should see the correlation matrix.
in above example std(A) = 1.29 so correlation(A) = COV(A)/(std * std):

```
 1.74419     0.581395    -0.581395    -1.74419
0.581395     0.193798    -0.193798    -0.581395
-0.581395    -0.193798     0.193798     0.581395
-1.74419    -0.581395     0.581395     1.74419
```

but we know that the correlation coefficients must be between -1 and 1 (diagonal elements must be equal to 1) but you see that in addition to being 1 in diagonal, the off-diagonal are greater than 1 in some cases!!

what is happening? how can I compute correct covariance that with conversion to correlation matrix all elements be in correct range?

or is it a code in IDL for computing the correlation matrix of vector?

Thanks,