
Subject: Re: Principle Componets Analysis

Posted by [David Streutker](#) on Fri, 24 Aug 2007 16:44:40 GMT

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For a reason I haven't quite figured out, the results of PCOMP and the ENVI results differ by a factor of the square root of the eigenvalue for the corresponding band.

This works for me:

```
x = [2.5, 0.5, 2.2, 1.9, 3.1, 2.3, 2.0, 1.0, 1.5, 1.1]
```

```
y = [2.4, 0.7, 2.9, 2.2, 3.0, 2.7, 1.6, 1.1, 1.6, 0.9]
```

```
;xmean = x - Mean(x)
```

```
;ymean = y - Mean(y)
```

```
Window, XSIZE=600, YSIZE=800
```

```
!P.MULTI=[0,1,2]
```

```
Plot, xmean, ymean, PSYM=7
```

```
;dataAdjust = Transpose([ xmean], [ymean] )
```

```
dataAdjust = Transpose([ x], [y] )
```

```
covArray = Correlate(dataAdjust, /COVARIANCE, /DOUBLE)
```

```
eigenvalues = EIGENQL(covArray, EIGENVECTORS=eigenvectors, /DOUBLE)
```

```
Print, 'EIGENVALUES: ', eigenvalues
```

```
Print, 'EIGENVECTORS: '
```

```
Print, eigenvectors
```

```
rowFeatureVector = eigenvectors[0,*] ; Take first principle component.
```

```
;rowFeatureVector = eigenvectors
```

```
finalData = Transpose(rowFeatureVector) ## Transpose(dataAdjust)
```

```
Plot, finaldata+Mean(x), finaldata+mean(y), PSYM=7
```

```
!P.MULTI=0
```

```
; Method using PCOMP in IDL library.
```

```
data = Transpose([x], [y])
```

```
;r = PCOMP(data, /COVARIANCE, NVARIABLES=1, EIGENVALUES=ev, /  
STANDARDIZE)
```

```
r = PCOMP(data, /COVARIANCE, EIGENVALUES=ev)
```

```
Print, 'IDL EIGENVALUES: ', ev
```

```
; Compare methods.
```

```
Window, 1
```

```
;PLOT, r
```

```
PLOT, r[0,*] / sqrt(ev[0])
```

```
OPLLOT, finalData, LINESTYLE=2
```

```
Window, 2
```

```
PLOT, r[0,*] / sqrt(ev[0]) + Mean(x), r[0,*] / sqrt(ev[0]) + Mean(y),  
PSYM=2  
;PLOT, r + Mean(x), r + Mean(y), PSYM=2  
OPLOT, finalData + Mean(x), finalData + Mean(y), PSYM=7  
END
```
