

# Re: How can I compute eigenvectors?

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- *From:* [see.sig@xxxxxxxx](mailto:see.sig@xxxxxxxx) (Victor Eijkhout)
  - *Date:* Sat, 14 May 2005 10:24:38 -0400
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Jeremy Watts <jwatts1970@xxxxxxxxxxxx> wrote:

> "Murat Aykut" <murat\_aykut@xxxxxxxx> wrote in message  
> [news:1115995167.751620.305730@xx](mailto:news:1115995167.751620.305730@xx)  
> >I am a Computer Engineering student. And, on my project I must do PCA  
> > training. So, I have computed eigenvalues via QR algorithm.

If you're doing PCA, your matrix is probably rectangular, not? In that case you're doing singular values, not eigenvalues.

> I too have recently written a computer program that finds eigenvalues via  
> the QR algorithm. As you know the QR algorithm effectively produces a Schur  
> decomposition such that a general matrix 'A' can be written  $A = UTU^*$  where  
> 'U' is a unitary matrix and 'T' is upper triangular and '\*' represents the  
> conjugate transpose.

For rectangular A that became  $UTV'$ , where the size of T is the rank of A.

> With each iteration of the QR algorithm we generate a 'Q matrix' and an 'R  
> matrix' and from these form the matrix product 'RQ' which is then further  
> QR decomposed and so on.

And that's where my knowledge ends. I can imagine that this doesn't work for rectangular matrices.

V.

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• *References:*

- ◆ *How can I compute eigenvectors?*  
◇ *From:* Murat Aykut
- ◆ *Re: How can I compute eigenvectors?*  
◇ *From:* Jeremy Watts

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