Subject: Re: Eigenvalue problem
Posted by Randall Skelton on Fri, 05 Jul 2002 12:53:01 GMT
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Hi Georg,

I think I actually posted an answer to a similar question back in April.
You may want to check the google group archive searching for 'Generalized
Eigenvectors.'

Given that you have a positive definite, symmetric matrix you can convert
to the tridiagonal form (TRIRED) and then use the QR procedure (TRIQL) to
iteratively find the eigenvalues/vectors from the tridiagonal array.

IDL's eigenvector/value code is based on the Numerical recepies code (see
the online text at www.nr.com) and assumes that you wish to solve

Ax = kx.

Solving the semantic 'general' case,

Ax = kBx,

is equivilent to solving,

(B^-1 A) x = kx.

which his is what Matlab is doing. This is actually described under the
'Remarks' section of the mathworks page you listed.

Hope this helps,
Randall

On Fri, 5 Jul 2002, Georg Wiora wrote:

> Hi!
>
> I have a mathematical problem with eigenvalues and -vectors. I need a
> special solution for the usual eigenvalue problem A*x = lambda*x where
> x is a vector and A a positive definite and symmetric real matrix.
> Using the EIGENQL function in IDL you can easily compute the
> eigenvectors and eigenvalues for that equation.
>
> My problem is that I need a constrained solution in the form
>   A*v = B*v*D
> A is again the matrix to find the eigenvalues for, B is the constraint matrix and v is the vector of
> eigenvalues and D the matrix of eigenvectors.

>
> Matlab offers a function for that. Here is the excerpt from their online help:
> [V,D] = eig(A,B) produces a diagonal matrix D of generalized eigenvalues and
> a full matrix V whose columns are the corresponding eigenvectors so
> that A*V = B*V*D.
> (see http://www.mathworks.com/access/helpdesk/help/techdoc/ref/ei g.shtml for the full documentation)
>
> Does anyone have an IDL-function that does the same job? Or does
> anyone know how to do it with the IDL matrix tools?
>
> Thanx for any advice!
>
> Georg Wiora
> DaimlerChrysler AG
> Research and Technology
> Ulm
> Germany
>
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