Re: ? dual spaces

Source: http://sci.tech−archive.net/Archive/sci.math/2007−10/msg04524.html

- *From*: "Cheng Cosine" <acosine@xxxxxxxxxx>
- *Date*: Thu, 25 Oct 2007 01:37:00 −0400

"Jack Schmidt" <Jack.Schmidt.SciMath@xxxxxxxxx> wrote in message news:7577067.1184781337314.JavaMail.jakarta@xxxxxxxxxxxxxxxxxxxxxxxxxx

> I don't think there is much hope in general, but for some specific types of nonlinear functions you may get what you want.
>
> For instance, work with the nonlinear function f(x) = xAx^t, where A is an n x n matrix, x is a 1 x n row vector, and f(x) is a 1 x 1 scalar. You can replace A by (A+A^t)/2 without changing the function, and this matrix is symmetric, and so normal. Write (A+A^t)/2 = UDU^t with U unitary and D diagonal, then f(xU^t) = Sum(di xi^2, i=1..n). In some sense then, you might be interested in those i with di=0, thinking of it like the kernel.

This reminds me something. If we define f(x) = x'*A*x/x'*x,

where A is Hermitian and x is N−by−1. Then lambda_min <=

f(x) <= lambda_max, where lambda denotes eigenvalue of A.

Can one say that any x in A's domain can be expressed by A's

e−vectors or one cannot because this is a nonlinear map?

But one can still form a smaller subset by constraining x_con

to be the subset "spanned" (if one may write that...) by some of

the e−vectors of A. More specifically, let u_n denote e−vectors

corresponding to e−values sorted from largest to smallest e−value

lambda_n. If x_con ={u_3, u_5} and dim(A) = 7, will the image be limited to lambda_5 <= f(x_con) <= lambda_3?

.