

---

Subject: Re: svd experts?

Posted by [Craig Markwardt](#) on Wed, 27 Jun 2001 01:40:34 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

"R.G.S." <rgs1967@hotmail.com> writes:

> Hail honourable svd experts,

I am not sure there are any SVD experts. :-)

You might have better luck on sci.math.num-analysis. There are some really good people there. And your question is really a mathematics question rather than an IDL question.

But my opinion is, yes, you should rescale if you can. In the best world your matrix entries would be unitless.

Craig

--

-----  
Craig B. Markwardt, Ph.D.      EMAIL: [craigmnet@cow.physics.wisc.edu](mailto:craigmnet@cow.physics.wisc.edu)  
Astrophysics, IDL, Finance, Derivatives | Remove "net" for better response  
-----

---

---

Subject: Re: svd experts?

Posted by [Dennis Boccippio](#) on Wed, 27 Jun 2001 06:32:31 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

Not an SVD expert, but a while back I came across the following info when using SVD as an alternative to normal-equations solution of an overdetermined system:

It is wise to scale A to have equal `_column lengths_`, particularly if the columns of A have very different numerical magnitudes (as might be obtained if A represented an instrument response kernel for inverting observations or fitting a model). Thus, the SVD would be performed on Z, where:

$$Z = A S^{-1}$$

and S is a diagonal matrix consisting of the roots of the diagonal elements of  $A^*A$  (A-transpose A).

I can't recall what the motivation for this was; numerical stability or some issue unique to SVD use in overdetermined systems.

I *\*believe\** the reference for this is:

Belsley, Kuh and Welch (1980): Regression Diagnostics, Identifying Influential Data and Sources of Collinearity, John Wiley & Sons, 292 pp. (SVD played of course a big part in their treatment of inversion of ill-conditioned matrices).

If not, it may be:

Draper and Smith (1981): Applied Regression Analysis. John Wiley & Sons, 407 pp.

Sorry for the ambiguity, it's been ~6 years since I had to deal with this and can't recall the exact reference...

- Dennis Boccippio, NASA/MSFC SD-60

In article <V68\_6.2448\$nx3.1001188453@den-news1.rmi.net>, "R.G.S." <rgs1967@hotmail.com> wrote:

- > Hail honourable svd experts,
- >
- > I'm using svdc and svsol to solve a matrix equation (like so).
- > SVDC, A, W, U, V,/double
- > result2 = SVSOL(U, W, V, data,/double)
- >
- > Is it a good idea to scale my data so that the A matrix
- > is between a certain range? such as (0,1).
- > I actually have julian day in there, so of course it seems
- > wise to subtract off a 'zero day' and bring the julian day into
- > a normal range, but how important is it to scale the magnitude
- > of the data?
- >
- > I figure I'd try a quick "ask the audience" before trying to figure
- > it out.
- >
- > Thanks!
- >
- > Cheers,
- > bob stockwell
- >
- >

---

Subject: Re: svd experts?

Thanks Dennis and Craig for the responses!

Cheers,  
bob stockwell

Dennis Boccippio <djboccip@hotmail.com> wrote in message  
news:djboccip-E005D8.01323127062001@news.mia.bellsouth.net.. .  
> Not an SVD expert, but a while back I came across the following info  
> when using SVD as an alternative to normal-equations solution of an  
> overdetermined system:  
>  
> It is wise to scale A to have equal \_column lengths\_, particularly if  
> the columns of A have very different numerical magnitudes (as might be  
> obtained if A represented an instrument response kernel for inverting  
> observations or fitting a model). Thus, the SVD would be performed on  
> Z, where:  
>  
>  $Z = A S^{-1}$   
>  
> and S is a diagonal matrix consisting of the roots of the diagonal  
> elements of  $A^*A$  (A-transpose A).  
>  
> I can't recall what the motivation for this was; numerical stability or  
> some issue unique to SVD use in overdetermined systems.  
>  
> I \*believe\* the reference for this is:  
>  
> Belsley, Kuh and Welch (1980): Regression Diagnostics, Identifying  
> Influential Data and Sources of Collinearity, John Wiley & Sons, 292 pp.  
> (SVD played of course a big part in their treatment of inversion of  
> ill-conditioned matrices).  
>  
> If not, it may be:  
>  
> Draper and Smith (1981): Applied Regression Analysis. John Wiley &  
> Sons, 407 pp.  
>  
> Sorry for the ambiguity, it's been ~6 years since I had to deal with

> this and can't recall the exact reference...  
>  
> - Dennis Boccippio, NASA/MSFC SD-60  
>  
>

---