

Re: ? determine major singular pair

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"Cheng Cosine" <acosine@xxxxxxxxxxxxx> wrote in message
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Hi:

The are methods to determine the major eigenpair of a square matrix A,

e.g., power method. But what if one is intereseted in determining the major

singular pair of a rectangular matrix? That is those left and right singular vectors

corresponding to the first largest singular values and those first largest singular

values themself. Are there algorithm availabe?

Let's add some more conditions. A straightforward approach is to form

$B = A^T A$ and $C = A A^T$ and then one can use those methods for solving

a square matrix's major eigenpair to get singular pair. But this approach has

a drawback on that when the larger dimension of square matrix A is big, say,

A is N-by-M and N is large, then $A A^T$ is N-by-N and requires significant

computer memory. Thus, a method does not require explicitly formulate

$A A^T$ is more desired.

Furthermore, in practice, one could face this situation that the explicit form

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of target rectangular matrix A is unknown. All one has are input vector and corresponding output vector: $A*x = b$, A is N -by- M , x is M -by-1, and b is N -by-1.

Given one x , a vector b can be obtained, but A is unknown. In this case, how does

one obtain A 's singular pair? Or maybe we can start with a simpler case when A

is a square matrix whose dimension is N -by- N , but entries remain unknown.

Thank,
by Cheng Cosine
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