expand the right−hand side on the basis of the eigenvectors of the matrix

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Hello!

I have a problem: Ax=b, where

A = [1001 1000;
1000 1001]

x = [x1 ;
x2]

b = [2001;
2001]

a small change of b db = [1;
−1]

Could somebody explain why the small variation in the right hand side produces large variations in the solution?
Here is a hint: expand the right−hand side on the basis of the eigenvectors of the matrix.

SO. I found eigenvectos: x01 = [1; x02 = [1;
1] −1]

It forms an orthogonal basis, because the matrix A is symmetric.

Then, when we expand the right hand side in the basis of the eigenvectors, then we have:

b = c1 * x01 + c2 * x02, Hence c1 = 2001 and c2 = 0

But, when we use (b + db) = c1 * x01 + c2 * x02, then c1 = 2001.5 and c2 = 0.5

So, in the first case c2 = 0 and in the second c2 = 0.5 .

I believe that the answer to the question: "why the small variation in the right hand side produces large variations in the solution? should be somewhere here...

But what is a name of a theorem or a method which will help me to anser such question.

Sinserely,
Taglit