

Re: Was there "legal" solution when the matrix is singular after GaussianElimination?

Re: Was there "legal" solution when the matrix is singular after GaussianElimination?

Source: <http://sci.tech-archive.net/Archive/sci.math/2007-04/msg03103.html>

- *From:* "dillogimp@xxxxxxxx" <dillogimp@xxxxxxxx>
 - *Date:* 21 Apr 2007 17:22:33 -0700
-

On Apr 22, 6:11 am, "Zdislav V. Kovarik" <kova...@xxxxxxxxxxxx> wrote:

On Sat, 21 Apr 2007, dillog...@xxxxxxxx wrote:

hi

Was there "legal" solution when the matrix is singular after GaussianElimination? That is, there are division by zero operations.

I suspect there is still "legal" solution but how to find those?
I have very good reason to suspect this, because I encounter singular matrix, aka division by zero, but the problem should have solution.

As soon as there is "division by zero operations" the usual gaussian elimination is "screwed" sorta speak. I bet people has encounter this type pf problems very often. Please share your insight. Thanks.

First: Do some search on

Least Squares Method,
Moore-Penrose Pseudoinverse,
QR-factorization,
Singular Value Decomposition.

These tools are well-devepoled and tested for singular (and near-singular) linear problems. If they help you, you do not need to read any further of my response.

Can you specify some properties which may help?

How big is your matrix?

Re: Was there "legal" solution when the matrix is singular after GaussianElimination?

Re: Was there "legal" solution when the matrix is singular after GaussianElimination?

the biggest ones are under 248x248

Is the matrix given exactly (such as, a matrix with integer, or rational and exactly stored, entries)?

all entries are integer and exact. all intermediates should be closed under rational.

Or, are the entries given by approximate numbers (obtained from measurements or so)?

In that case, was the "division by zero" actually "division by near-zero" (resulting in overflow, or near-overflow)?

divide by zero as really divide by zero.

What version of Gauss elimination was used? Partial pivoting, complete pivoting, or no-pivoting (relying on presumed (semi)definiteness or other usable assumption)? (This happens with statistical calculations.)

I think it's just regular pivoting. I don't know about partial pivoting.

I did a TI-82 version when I was a student a long time ago, but I've since forgot all about it. The version I am using is very basic I think (I got it off the web). I simply modify it's exception handling and added early abort.

During elimination, was the information about row operations recorded or forgotten?

I have the code in front of me, if necessary, I can make changes to it.

Is there a physical problem behind your system that has known "conservation laws" or "solvability conditions"?

Re: Was there "legal" solution when the matrix is singular after GaussianElimination?

Re: Was there "legal" solution when the matrix is singular after GaussianElimination?

Or still something that I did not list?

I think I have run into interpretation problem of my own model.
I know the (original) problem has solution, but maybe using matrix model is "too shape" a tool...

I was doing multivariate interpolation of integer sequences,
I encounter some real strange head cases, sorta speak.

Unless you are interested in the details of my encounters, I will not bore you with it. I will look at the list of your suggestion, first. I think I have a problem with my model. Thank.s

Cheers, ZVK(Slavek).