Re: 4x4 matrices using Cramer's Rule

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Virgil wrote:

> In article <a1658$457d265b$82a1e228$31541@xxxxxxxxxxxxxxxx>,
> Han de Bruijn <Han.deBruijn@xxxxxxxxxxxxxx> wrote:
>
>> Uinseann wrote:
>>
>>> Anyone got any ideas on how to solve 4x4 matrices by using
>>> Cramer's
>>> Rule. I've looked in a multitude of math books and surfed the
>>> web for
>>> hours to no avail. I can do a 3x3 no problem but
>>> unfortunately I dont
>>> seem to be able to see how to do a 4X4. Any advice that
>>> anyone might
>>> be able to offer regarding the problem below would be
>>> greatly
>>> appreciated.
>>>
>>> 13 10 0 0 i1 6
>>> −10 13 0 −3 X i2 = 10
>>> 0 0 18 −3 i3 0
>>> 0 −3 −3 6 i4 5
>>
>> The following is in Delphi Pascal. I hope it's so much readable that you
>> can translate it into you own favorite programming language. The outcome
>> is, iff I've made no mistakes:
>>
>> −2.38532110091743E−0001 = i1
>> 9.10091743119266E−0001 = i2
>> 2.34250764525994E−0001 = i3
>> 1.40550458715596E+0000 = i4
>
> Or det(M) = 24525 and

> i1 = −5850/24525 = −26/109
> i2 = 22320/24525 = 496/545
> i3 = 5745/24525 = 383/1635
> i4 = 34470/24525 = 766/545

Very good, Virgil.

> Is there any particular reason why you need to use Cramer's rule?
>
> There are much better methods.

Cramer's rule is only useful for very small matrices, BUT there are MANY problems with such small matrices. Cramer's rule has the advantage that it gives always an easy solution iff the matrix is non−singular. Integer problems as the above can also be programmed in such a way that floating point operations are avoided altogether, preserving an "exact" solution, as you have demonstrated. An obvious drawback is that Cramer's rule very quickly runs out of performance. Therefore use is delimited to matrices with rank < 6 or 7 or some such. Quite a severe limitation, admittedly.

Han de Bruijn

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