

Re: Can I solve that with Runge–Kutta?

Source: <http://coding.derkeiler.com/Archive/Fortran/comp.lang.fortran/2005-03/0464.html>

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Date: 03/09/05

Date: Wed, 9 Mar 2005 11:50:28 -0500

"Donald R. Fredkin" <drfredkin@sbcglobal.net> wrote in message
news:Xns9613E9067DFB2dlnet@207.115.63.158...

> "J DUDLEY" <sbdpumbaa@blueyonder.co.uk> wrote in
> news:x1oXd.19219\$y25.6413@fe3.news.blueyonder.co.uk:

>

>> *What is in the Langevin equation that inhibits a Runge–Kutta code?*
>> *Typically all I have found that prevents 'success' is stiffness, with*
>> *stiffness increasing (approximately) as the square of the number of*
>> *elements.*

>

> *The Langevin equation is a stochastic differential equation (SDE). None*
of
> *the standard techniques for solution of ordinary differential equations*
are

> *applicable. You must, to start, understand what it means to solve an*
> *equation containing terms which are given only in a statistical sense.*

And

> *then you must recognize the extreme lack of smoothness in the random*
terms.

> *Stiffness is not an issue, and the BDF methods appropriate to stiff*
> *equations are guaranteed to fail for SDEs.*

>

Indeed.

> *There is an extensive literature on the subject. A reasonably undemanding*
> *starting point might be "Numerical solution of stochastic differential*
> *equations" by Peter E. Kloeden and Eckhard Platen, Springer–Verlag, 1992.*

>

> *I do not know of any canned codes.*

DESMOND J. HIGHAM, AN ALGORITHMIC INTRODUCTION TO NUMERICAL SIMULATION OF
STOCHASTIC DIFFERENTIAL EQUATIONS, in SIAM Review, Education Section, Vol
43, 2001, 525—546, gives a link to Matlab .m scripts that illustrate this
tutorial on SDE's. Also www-math.bgsu.edu/~zirbel/sde/langevin.m might be
of interest to the OP.

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comp.lang.fortran: Re: Can I solve that with Runge–Kutta?

You're Welcome,
Gerry T.

"Things are not what they seem; or, to be more accurate, they are not only what they seem, but very much else besides." -- Aldous Huxley.