Re: How to deal with such ODE with fortran?

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- *From*: Nye <zuying@xxxxxxxxx>
- *Date*: Fri, 27 Oct 2006 20:45:40 +0800

"Arjen Markus" <arjen.markus@xxxxxxxxxx> writes:

Nye schreef:

Hi all, I will try to make myself understood as clearly as possible, though the problem is a little complicated, and, my English is not very well.

the ODE has a form like this:

d P(t,k)/ d t = RHS(P,t,k)

what is weird here is that RHS(P,t,k) is a function of the concrete form of function P(t,x) at certain step t, not merely the value of it.

inf
/
RHS(P,t,k) = | P(t,k*y)F(y) dy
/
0
given the initial conditions: P(t=0,x)=P1(x), RHS(P=P1,t=0,k)=RHS1(k)

when t=tn,
Pn(tn,x) = Pm(tm,x)+(STEPSIZE of t)*RHS(Pm,tm,x)
where m=n−1, the formula above gives the recursive procedure I should follow in the program.

please take notice of the confusability of k and x, in the output of the program, I want to get a series of P(t=t_end,k), k = k1,k2,k3....kp...k60, i.e. a series of points on the output curve of function P(t=t_end, x). That is to say, I have to an integrate different ODE for each kp.

so far, the problem is that, how to transfer the parameters effectively, without causing confusion in the recursive procedure. For example, there is an integration for RHS,

RHs(Pn,tn,k) calls P(tn,x), but the subroutine doing integration only

> accept single value func as its parameter, so I should transform P(tn,x) to P(x) |t=tn, where COMMON block would be used. How to make a common
> block available and correct in a recursive procedure, given that the block would change its value in different period of recursion?
>
> I have thought of a method to crack the integration subroutine to accept tn as a parameter, but that would destroy its stability, which I don't prefer to.
>
> any suggestions or comments on the algorithm? I will greatly appreciate them since I havn't start my code yet....:) thanks

> This is known as a integro−differential equation. Have you checked the available literature for suitable numerical methods?

I am not familiar with this kind of equation, so I am now writing codes all by myself and I suffer a lot....

Will you please give me some materials on the algorithms and methods for it?

Thanks

> If you want help on your current program, howver, I suggest you show us at least the structure − the description you gave does not make it easy to understand what you are after.

I havn't made my codes work yet....debugging, and I am desperate now...

> Regards,
>
> Arjen

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Don't forget your dreamS
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