

How to deal with such ODE with fortran?

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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.

$$\int_0^{\infty} RHS(P,t,k) = \int_0^{\infty} P(t,k*y)F(y) dy$$

given the initial conditions: $P(t=0,x)=P1(x)$, $RHS(P=P1,t=0,k)=RHS1(k)$

when $t=tn$,
 $Pn(tn,x) = Pm(tm,x) + (STEP\ SIZE\ of\ t) * RHS(Pm,tm,x)$
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?

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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 haven't start my code yet....:) thanks

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Don't forget your dreamS

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