Subject: Solving system of ODEs backwards in time?
Posted by BLesht on Sun, 30 Jul 2017 18:37:45 GMT
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I have a system of ODEs describing how a system with N state variables (C) evolves in time. The basic equation set is dC/dt = (W + A dot C) / V in which C is the state variable vector at time i, V is a vector of constants, W is a known vector (a function of t), and A is a known matrix (similarly time variable). Given an initial condition C[0], I've been using LSODE to solve for the successive time steps, updating the initial condition and values of W and A along the way. This has worked well.

Now I'd like to reverse the problem. That is, if I know the value of the state vector at time i, and the values of W and A at time i-1, I'd like to compute the value of the state vector at time i-1. In essence, I want to know what the initial condition had to be to arrive at the current state of the system given known V, W and A.

Frankly, it's been many, many years since I took an ODE class and I wasn't very adept then. I'd greatly appreciate any advice on how to approach this problem.

Thanks, Barry