Heun Algorithm

ECE 523 hw10 Ordinary Differential Equations Homework Author:Qihao He Due date: 11/28/2016
[xc,fxc,exitflag,iter,funeval]=HA(fun1,fun2,M(matrix),xo(initial),h(stepsize),t0(start),t1(end))

```matlab
function [tspan,xc,exitflag]=HA(M,xo,h,t0,t1)
%-----~ Initialize Variables ~-----
xk=xo;% store the initial guess xo
tspan=t0:h:t1;%initialize the time span
m=size(tspan,2);%get the time span size
n=size(xk,1);% get the size of xk
exitflag=0;
xkp1=zeros(n,1);% xk+1
xkp1h=zeros(n,1);% xk+1 hat
xc=zeros(n,m);% initilize the output xc
dxk=zeros(n,1);% derivative xk+1
dxkp1h=zeros(n,1);% derivative xk+1 hat
tk=t0;
%-----~ Iterative Body ~-------
for k=1:m% prevent infinit loop
    %-----~ store vector ~-----
    xc(:,k)=xk;
    %-----~ Do step ~-----
    dxk=M*xk;% derivative xk+1
    xkp1h=xk+h*dxk;% xk+1 hat
    dxkp1h=M*xkp1;% derivative xk+1 hat
    xkp1=xk+(h/2)*(dxkp1h+dxk);

    %-----~ Increment ~-----
    xk=xkp1;
    tk=tk+h;
end
exitflag=1;

Not enough input arguments.

Error in HA (line 7)
xk=xo;% store the initial guess xo
```

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