

ME205: Solutions to an Exercise in Euler's Method

1. $dx/dt = -x^2/(t+x^{1/2})$

2. The following Scilab code may be used to generate the subsequent plot for h values of 0.3, 0.2, and 0.05.

```
//set parameters  
  
// step size list to consider  
for h = 0.2;  
  x0=20;  
  t=0;  
  i=1;  
  tmax=5;  
  // initialize the vectors  
  time=[];  
  x=[];  
  
  //Euler iteration loop  
  while t <=tmax;  
    time(i)=t;  
    x(i)=x0;  
    t=t+h;  
    x0=x0-h*x0^2/(t+sqrt(x0));  
    i=i+1;  
  end
```

3. For values of h larger than about 0.3, the method becomes unstable. Try it.

4. One can modify the above Scilab code to get a precise value at $t = 0.5$ for a small value of h. Use the “disp” command. You should get a value of 4.78(1).



