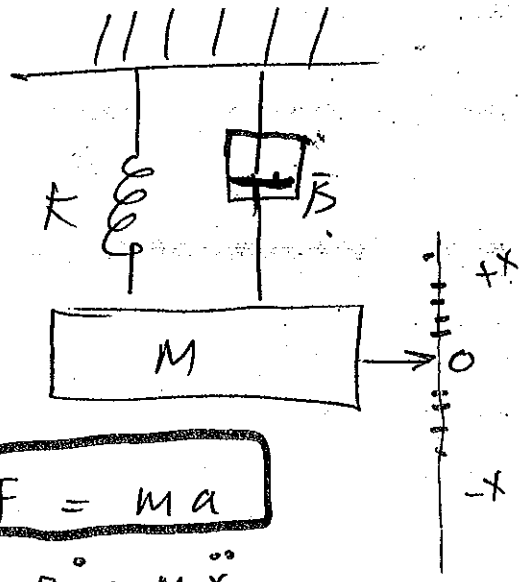
EGN 3420
FALL 2011
Dr Bauer

HMWK # 8
due MON NOV 28

LAST CLASS, WED NOV 30;
TEST REVIEW DAY;
TEST III: WED DEC 7, 8-10 AM

```
%spring-mass block simulation
%  by c.s. bauer
%   november 20, 2001
time=0;
tstop=input(' enter tstop now ');
m=input(' enter value of m now ');
k= input(' enter value of k now ');
b=input(' enter value of b now ');
dt=input(' enter value of time step now ');
pos=input(' enter starting position now ');
vel=input(' enter starting velocity now ');
i=1;
while time < tstop
    t(i) = time;
    xdot(i)= vel;
    x(i)=pos;
    acc= -(k/m)*pos -(b/m)*vel;
    x2dot(i)=acc;
    vel = vel + acc*dt;
    pos= pos + vel*dt;
    time=time+dt;
    i=i+1;
end
out=[t',x2dot',xdot',x']
```

Rectangular integration



$$\Sigma F = Ma$$

$$-kx - B\dot{x} = M\ddot{x}$$

$$\ddot{x} = -\frac{k}{M}x - \frac{B}{M}\dot{x}$$

where $x = x(t)$

$\dot{x} = dx(t)/dt$

$\ddot{x} = d^2x(t)/dt^2$

This program saves and prints output at each dt step. As it uses simple rectangular integration, we would like to use a small value for dt to give sufficient accuracy. Modify the program to read a new variable NSTEP, and change its operation to save and print output only after each NSTEP iterations.

Run the new program for { TSTOP = 25, M = 100, K = 100, B = 50, dt = .001, NSTEP = 1000, POS = 10, VEL = 0 }

SUBMIT PLOTS OF XZDOT VS TIME, XDOT VS TIME, and X VS. TIME