

Math 350 — Computer Assignment 6, due April 14, 2011

General remark: If you are using the MATLAB function `quad` to solve any of the following problems, then make sure that your function is *vectorized*. For example, use

```
f = @(x) = 2./(1+x.^2);
```

instead of

```
f = @(x) = 2/(1+x^2);
```

1. An accelerometer is used in aircraft, rockets, and other vehicles to estimate the vehicle's velocity and displacement. The accelerometer integrates the acceleration signal to produce an estimate of the velocity, and it integrates the velocity estimate to produce an estimate of displacement. Suppose the vehicle starts from rest at time $t = 0$, and its measured acceleration is given in the following table.

Time (s)	0	1	2	3	4	5	6	7	8	9	10
Acceleration (m/s^2)	0	2	4	7	11	17	24	32	41	48	51

- (a) Use a numerical integration method of your choice to estimate the velocity at times $t = 1, 2, \dots, 10s$.
 - (b) Use a numerical integration method of your choice to estimate the displacement at times $t = 1, 2, \dots, 10s$.
2. Do Exercise 6.3 in NCM. Values of $n = 2^k$, $k = 1, 2, \dots, 20$, should work fine.
 3. Do Exercise 6.10 in NCM. If you don't have access to the Symbolic Toolbox/MuPAD, then use Maple or Mathematica instead.
 4. Do Exercise 6.13 in NCM. If you don't have access to the Symbolic Toolbox/MuPAD, then use Maple, Mathematica or a messy hand-calculation instead.
 5. Do Exercise 6.23 in NCM.