

**Due Wednesday, 31 March:**

- page 337: 1, 2, 3, 4
- page 343: 1, 2, 5, 6, 7

In addition, do the following problem:

**A.** Let  $A$  be the matrix

$$A = \begin{pmatrix} 0.7 & 0.9 & 0.6 \\ -1.6 & 1.8 & -0.8 \\ -2.6 & -0.2 & -1.8 \end{pmatrix}$$

- (a) Choose two vectors  $u_0$  and  $v_0$  in  $\mathbf{R}^3$  that are linearly independent and satisfy  $1 \leq \|u_0\| \leq 10$  and  $1 \leq \|v_0\| \leq 10$ .
- (b) For  $k = 1, 2, 3, \dots, 20$ , use a machine to calculate  $u_k = Au_{k-1}$ . (Note: although I doubt it will happen, if the absolute value of some component of  $u_k$  is larger than 100, replace  $u_k$  by  $(.05)u_k$  before proceeding with the computations; similarly, if the absolute values of all components of  $u_k$  are less than .01, replace  $u_k$  by  $20u_k$  before proceeding with the computations ).
- (c) For  $k = 1, 2, 3, \dots, 20$ , use a machine to calculate  $v_k = Av_{k-1}$ . (Note: although I doubt it will happen, if the absolute value of some component of  $v_k$  is larger than 100, replace  $v_k$  by  $(.05)v_k$  before proceeding with the computations; similarly, if the absolute values of all components of  $v_k$  are less than .01, replace  $v_k$  by  $20v_k$  before proceeding with the computations ).
- (d) Do you notice anything about  $u_{20}$  and  $v_{20}$ ? How are these vectors related to  $A$ ?