

**Homework 4**  
**due Thursday, Oct. 12**

(1-3) Plot  $\|A^n\|$  for  $1 \leq n \leq 100$  for each of the following matrices and explain what you see:

$$A = \begin{pmatrix} 294.6 & 376.7 & -217.2 \\ -84.6 & -108.1 & 62.4 \\ 250.6 & 320.6 & -184.7 \end{pmatrix} \quad (1)$$

$$A = \begin{pmatrix} 0.740 & -0.2880 & -0.3840 \\ -0.288 & 0.2936 & 0.1248 \\ -0.384 & 0.1248 & 0.3664 \end{pmatrix} \quad (2)$$

$$A = \begin{pmatrix} 0 & -3 & 5 \\ -1 & -6 & 11 \\ 0 & -4 & 7 \end{pmatrix} \quad (3)$$

(4) What is the consistency order of the method

$$y_{n+1} - 2y_n + y_{n-1} = h \left[ \frac{3}{2}f_n - 2f_{n-1} + \frac{1}{2}f_{n-2} \right].$$

Is the method stable?

(5) Use the method of problem (4) to solve the 2-d gravity problem from homework 2. At what order does it appear to be converging? Explain what's going on.