

Exercises

1. Play the “chaos game.” In this game, let $x = [0, 0]^T$ and then repeatedly replace x by $Ax + b$, where $A = \begin{bmatrix} 1/2 & 0 \\ 0 & 1/2 \end{bmatrix}$, and b is chosen randomly from the three vectors

$$\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \quad \begin{bmatrix} 1/2 \\ 0 \end{bmatrix}, \quad \begin{bmatrix} 1/4 \\ \sqrt{3}/4 \end{bmatrix}.$$

Add a dot for each value of x into a plot in the x_1 - x_2 plane.

2. Let

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}, \quad b = \begin{bmatrix} 1 \\ 3 \\ 5 \end{bmatrix}.$$

- (a) Do elimination manually in MATLAB for this system (as in the demo). What does the result tell you about the linear system?
- (b) Use backslash to solve the original linear system. Is the result valid?