

Week 11 Linear Algebra worksheet
MATH1014

- (1) Let $A = \begin{bmatrix} 3 & 0 \\ 0 & \frac{1}{3} \end{bmatrix}$ and consider the discrete dynamical system $\mathbf{x}_{i+1} = A\mathbf{x}_i$.
- (a) Is the origin an attractor, a repeller, or a saddle point?
 - (b) Draw several trajectories of this system, assuming that A is the standard matrix for the associated transformation.
 - (c) How do these trajectories change if we suppose that A is written with respect to the basis $\mathcal{B} = \left\{ \begin{bmatrix} 1 \\ 1 \end{bmatrix}_{\mathcal{E}}, \begin{bmatrix} -1 \\ 1 \end{bmatrix}_{\mathcal{E}} \right\}$?
- (2) If W is the plane $ax + by + cz = 0$ in \mathbb{R}^3 , describe W^\perp .