

MA 771 Exercises

- 1.1. Let $X = [0, 1]$. Define $f : X \rightarrow X$ by $f(x) = 1 - x$. Describe the suspension M of $f : X \rightarrow X$ and the dynamics of the suspended flow $\phi_t : M \rightarrow M$.
- 1.2. Let f be complex conjugation of the circle S^1 . In other words, if S^1 is thought of as all complex numbers z such that $|z| = 1$, then $f(z) = \bar{z}$. Describe the suspension M of $f : S^1 \rightarrow S^1$ and the dynamics of the suspended flow $\phi_t : M \rightarrow M$.
- 1.3. Let $L : \mathbb{R}^2 \rightarrow \mathbb{R}^2$ be the linear map

$$L \begin{pmatrix} x_1 \\ x_2 \end{pmatrix} = \begin{pmatrix} \frac{1}{2} & 1 \\ 0 & \frac{1}{2} \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \end{pmatrix}.$$

Show (using estimates) that

$$L^n \begin{pmatrix} x_1 \\ x_2 \end{pmatrix} \rightarrow \begin{pmatrix} 0 \\ 0 \end{pmatrix}$$

as $n \rightarrow \infty$.