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Let  $M$  be a compact connected surface without boundary with an Euler characteristic  $\chi(M) \geq 0$ . Let  $f: M \rightarrow M$  be a continuous open finite-to-one map of  $M$ .

Let  $A, R$  be an attractor-repeller pair of the dynamical system  $(M, f)$ . Let  $S$  be an open connected component of the set  $M \setminus (\cup_{n \geq 0} f^{-n}(A) \cup R)$  such that  $f^{-1}(S) = S$ .

Suppose  $S$  has an open subset  $V$ , where  $V$  is homeomorphic to a ring  $S^1 \times \mathbb{R}^1$ ,  $f(V) \subset V$  and a function  $\phi: V \rightarrow (-\infty, 0)$ :  $\phi(f(x)) = \phi(x) - 1$ .

Then  $S$  has the following topology:

**Theorem 1.**  *$S$  is a planar surface.*

It is known that the topological type of the planar surface  $S$  is completely determined by its set of ends  $\text{Ends}(S)$ .  $f$  induces a dynamical system  $\hat{f}: S \cup \text{Ends}(S) \rightarrow S \cup \text{Ends}(S)$ . Denote by  $A^* \subset \text{Ends}(S)$  and  $R^* \subset \text{Ends}(S)$  the induced attractor and repeller for  $\hat{f}$ .

**Theorem 2.**

- (1)  $\text{Ends}(S) = EA^* \sqcup R^*$ .
- (2)  $|A^*| = 1$ .
- (3)  $EA^*$  is at most countable set with discrete topology in  $\text{Ends}(S)$ .

#### REFERENCES

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