# Topological fixed point theory: algebraic periods of surface homeomorphisms

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One of classical problems in topological theory of dynamical systems is to find $n$-periodic points of a map $f\colon X \to X$ of a space $X$, i.e. $x \in X$ such that $f^n(x) = x$ for some $n \in \mathbb{N}$. A fundamental tool in fixed and periodic point theory is the Lefschetz fixed point theorem. If $X$ is a compact CW-complex, $f$ determines the sequence $\{L(f^n)\}_{n=1}^{\infty}$ of the Lefschetz numbers of its iterations. We consider its dual sequence $\{a_n(f)\}_{n=1}^{\infty}$ given by the Möbius inversion formula. The set $\mathcal{AP}(f) = \{n : a_n(f) \neq 0\}$ is called the set of algebraic periods of $f$. In the generic class of transversal maps it provides information about periodic points even in the homotopy class of the map. During the talk we will describe finite sets of algebraic periods of homeomorphisms of an orientable surface, especially of Morse–Smale diffeomorphisms. The talk is based on the joint project with G. Graff, W. Marzantowicz and A. Myszkowski.