1116-16-882   **S. Paul Smith*** (`smith@math.washington.edu`). *Positive entropy automorphisms and free subalgebras.*

Let X be a smooth projective surface defined over an uncountable algebraically closed field k, $k(X)$ its field of rational functions, and s be an automorphism of X. We show there is a non-negative integer n and elements $a, b \in k(X)$ such that the subalgebra of the skew Laurent extension $k(X)[t, t^{-1}; s]$ generated by at^n and bt^n is a free algebra if and only if the spectral radius for the action of s^* on the Neron-Severi group of X is > 1. Thus, when s is an automorphism of a smooth complex projective surface X, $\mathbb{C}(X)[t, t^{-1}; s]$ has a free subalgebra on > 1 variables if and only if the topological entropy of s is positive. Furthermore, if s is an automorphism of $k(X)$, then $k(X)[t, t^{-1}; s]$ contains a free subalgebra if and only if the dynamical degree of s is > 1; in this situation, s might not be induced by an automorphism of any smooth projective surface. These results are used to show that certain twisted homogeneous coordinate rings of smooth projective surfaces contain free subalgebras. (Received September 14, 2015)

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