1116-20-626 **Ilir Snopce*** (ilir@im.ufrj.br), Praia de Botafogo 22, Apt. 804, Rio de Janeiro, 22250-145, Brazil. *Asymptotic density of test elements in free groups and surface groups.*

Let G be a finitely generated group with a finite generating set X, d_X the word metric on G with respect to X and $B_X(r)$ the ball of radius $r \geq 0$ centered at the identity in the metric space (G, d_X). Given $S \subseteq G$, the *asymptotic density* of S in G with respect to X is defined as

$$\overline{\rho}_X(S) = \limsup_{k \to \infty} \frac{|S \cap B_X(k)|}{|B_X(k)|}.$$

An element g of a group G is called a test element if for any endomorphism φ of G , $\varphi(g) = g$ implies that φ is an automorphism. The first example of a test element was given by Nielsen in 1918, when he proved that every endomorphism of a free group of rank 2 that fixes the commutator $[x_1, x_2]$ of a pair of generators must be an automorphism.

Let G be a free group of finite rank, an orientable surface group of genus $n \geq 2$, or a non-orientable surface group of genus $n \geq 3$. Let $\mathcal{T}$ be the set of test elements of G. In this talk I will discuss the distribution of $\mathcal{T}$ in G. In particular, I will show that $\mathcal{T}$ has positive asymptotic density in G. This answers a question of Kapovich, Rivin, Schupp, and Shpilrain. This is a joint work with Slobodan Tanushevski. (Received September 09, 2015)