1106-53-309 **Carlos Alberto Cadavid*** (ccadavid@eafit.edu.co), **Juan Diego Velez** (jdvelez@unal.edu.co) and **Jean Carlos Cortissoz** (jean.cortissoz@gmail.com). *Minimal Morse functions via the heat equation.* Preliminary report.

Let (M, g) be a closed Riemannian manifold that is homogeneous, in the sense that each pair of points have mutually isometric neighborhoods, and let Δ_g be its Laplace-Beltrami operator. The heat equation on (M, g) is $\frac{\partial f}{\partial t} = -\Delta_g(f)$ and for each initial condition u in $L^2(M)$ there exists a unique solution $f_t(\cdot) := f(\cdot, t)$ satisfying $f_0 = u$.

It has been observed in several examples that for generic u and large enough t, that f_t is a Morse function having the least number of critical points admitted by any Morse function on M. There are examples in which this phenomenon does not hold in the form just stated, but seems to take place if one perturbs the metric g a bit. In order to probe the validity of the statement in this latter form, computational experiments have been performed in which the Riemannian manifold and its Laplace-Beltrami operator have been approximated by a graph and its Laplacian operator.

This suggests that it is worth asking whether a similar phenomenon holds for graphs. (Received August 20, 2014)