1085-60-37 **Jorge M Ramirez*** (jmramirezo@unal.edu.co), Calle 59A No 63-20, Bloque 43 - 242, Medellin, Antioquia 05001000, Colombia. *Diffusion processes on graphs: construction and applications.*

Consider a graph Γ consisting of infinite edges e_0, e_1, e_2 joined at node ϕ. A function $f : \Gamma \to \mathbb{R}$ is specified by its restrictions $f_i : [0, \infty) \to \mathbb{R}$ to each of the edges. For positive, non-zero numbers D_i, $i = 0, 1, 2$, we consider parabolic operators acting on functions over Γ. One example is the operator A given by $(Af)_i = D_i f_i''$ acting on functions that are smooth inside each edge of Γ, and satisfy the flux condition $\sum_i D_i f_i'(0^+) = 0$, at node ϕ. The associated stochastic process $\{X(t) : t \geq 0\}$ is a Feller process on Γ that has A as its infinitesimal generator. The sample paths of X behave like (appropriately re-scaled) Brownian motion inside each edge, but have different transition probabilities from the node into each of the adjoining edges, generalizing the notion of "skew Brownian motion" to a graph. Application examples include dispersion phenomena in river systems, blood vessels, and electrical networks. In this talk we also consider, in particular, the case where the diffusion process contains a non-zero advection term, e.g. $(Af)_i = D_i f_i'' + v_i f'$. (Received August 14, 2012)