

**Speaker**

Aroldo Pérez Pérez

**Title**

Global and nonglobal solutions for a nonautonomous semilinear system with Dirichlet boundary condition

**Abstract**

We consider a semi-linear system of the form  $\partial u_i(t, x)/\partial t = k(t)\mathcal{A}u_i(t, x) + u_j^{\beta_i}(t, x)$ , with Dirichlet boundary conditions on a bounded open set  $D \subset \mathbb{R}^d$ , where  $k : [0, \infty) \rightarrow [0, \infty)$  is continuous,  $\mathcal{A}$  is the infinitesimal generator of a symmetric Lévy process  $Z \equiv \{Z(t), t \geq 0\}$ ,  $\beta_i > 1$  and  $j \in \{1, 2\} \setminus \{i\}$ ,  $i \in \{1, 2\}$ . It is known that under some conditions on  $D$  and the Lévy measure of  $Z$  the semigroup  $\{S_D(t), t \geq 0\}$  associated to the process  $Z$  killed on exiting  $D$  is an intrinsically ultracontractive semigroup. Making use of this property we have found a sufficient condition for the blow up in finite time of the positive mild solution for the above system. We also give conditions ensuring existence of a global positive solution.