



**Mês de:            OUTUBRO 2012**

## **SEMINÁRIO DE LÓGICA MATEMÁTICA**

**Dia 25 de Outubro (quinta-feira), às 17h, na Sala B3-01**

Computational power of threshold experiments

**Diogo Poças**

(IST)

**Abstract:**

Computability theory reasons about computable functions in discrete data. On the other hand, physical experiment of measurement can be used to retrieve information in a real, thought continuous world. Can we use such physical experiments to compute a function or decide a set? And if so, what is the computational gain by using experiments?

In our talk we will present a model of computation called analog-digital Turing machines, introduced by Beggs, Costa, Loff and Tucker in 2008. These machines combine a Turing machine with a physical experiment of measurement.

So far, in recent papers, Beggs, Costa and Tucker have been considering measurements (in the sense of Hempel) where the unknown value is approached simultaneously from above and from below (such as in the measurement of a length).

However, there are experiments in physics such as the determination of a threshold (in a spiking neuron, in the photoelectric effect, in scattering of particles in a Coulombian field), where the unknown value can only be approached either from below or from above. We will attempt to give a measurement algorithm for that purpose and to derive the complexity classes decided by such threshold Turing machines in polynomial time, considering different degrees of precision in the measurement procedure.

(joint work with José Félix Costa)

Local:  
**INSTITUTO PARA A INVESTIGAÇÃO  
INTERDISCIPLINAR**  
Av. Prof. Gama Pinto, 2  
1649-003 Lisboa

