

## Dynamical Systems Seminar

**Date.** November 16, 14h30

**Place.** Room M031

**Speaker.** Manuela Aguiar (Faculty of Economics, University of Porto & CMUP)

**Title.** The Patterns of Synchrony of a Coupled Cell Network

**Abstract.** A coupled cell system is a dynamical system distributed over the nodes (cells) of a network. Each cell is an individual dynamical system (either discrete or continuous) and the coupling structure of the network indicates the mutual interactions between those cell dynamics.

In the continuous context, a set of cells is said to be synchronized, if their individual dynamics coincide over time. In that case, the subspace defined in terms of the equalities of the synchronized cells coordinates is flow-invariant by all the admissible vector fields and is called a synchrony subspace. Synchrony subspaces are important from the point of view of the study of the dynamics, namely, in the bifurcation analysis. Surprisingly, synchrony subspaces are independent of the specific individual dynamics at the nodes and are determined only by the network structure. That is, all the coupled cell systems admissible by a given network share the same structure of patterns of synchrony.

Stewart proved that the set of synchrony subspaces of a network is a complete lattice. We describe how to obtain that lattice, for a given network, based on the eigenvalue structure of the network adjacency matrices and we present an algorithm that generates the lattice.

This is joint work with Ana Dias (University of Porto).

**Remark.** Coffee with the speaker is served after the talk (15h30 - 16h00)