

Global dynamics and heteroclinic cycles in coupled cell systems

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The focus of the talk will be on transitive (strongly connected) identical cell networks with asymmetric inputs. Cell dynamics are allowed to be continuous, discrete or hybrid (a mixture of discrete and continuous dynamics). We describe how the network structure can force the appearance of invariant subspaces (synchrony subspaces) and give conditions under which these invariant subspaces can support robust attracting heteroclinic cycles including in asymmetric networks with as few as three cells governed by one-dimensional cell dynamics. We also describe how the dynamics of coupled cell networks of different structures and numbers of cells can be related; in particular we consider inflations of a coupled cell network obtained by replacing one cell by multiple cells of the same type, so that the original network dynamics is still present within a synchrony subspace. We illustrate our results with a number of model two-input networks with up to six cells. The work presented is joint with Manuela Aguiar (Porto), Ana Dias (Porto), and Peter Ashwin (Exeter, UK).

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