Self Organizing Networks

- Complex Adaptive systems characteristics
- Non-Linearity: Small actions cause large reactions
- Pattern emergence
- Dynamic System change
  - Intersystem interactions are volatile and can cascade
- Adaptation: interacting elements adapt to each other
- uncertainty: Processes and outcomes are unpredictable, uncontrollable and unknown in advance
- Co-Evolutionary: agents evolve together

Methods of Modelling

CA

- Spacial lattice of Cells with states
- States

Cell state at t+1 depends on cell state at t plus state of some of neighbours at t

Updates follow simple rules

The final state depends on neighbours and update rules

In telecoms cellular automata could be used for signal interference avoidance

Agent Based modelling (ABM)

- Simplified entities within a system interacting with each other
- Signals and Rules

Agents

- Anything that makes choices in the network
- Autonomous
- Can be adaptive
- Can exist on multiple levels

Assumptions

- Agents operate in parallel
- No central command

Rules

- Agents are guided by internal rules

Telecommunications ABM

The agents are network entities

- End devices (phones etc.)
- Base stations
- core units

Allows integrationof non-telecoms events

Captures emergence (emergent behavior?) from collection of rules

Acronyms

CA: Cellular Automata ABM: Agent Based Modelling