Course G: Basic neurosciences 2

Computational neuroscience

Tutorial
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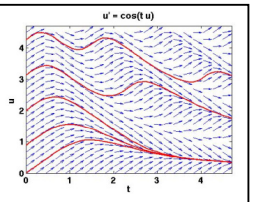
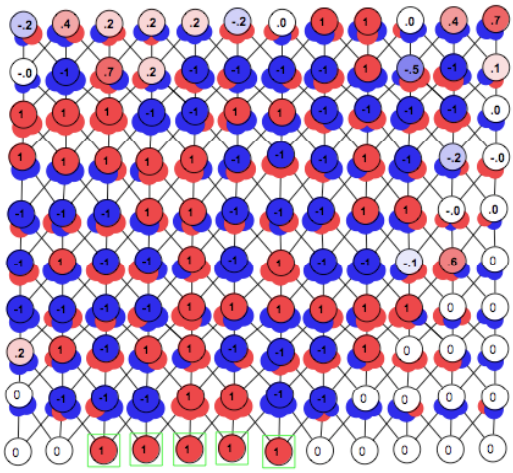
Summer term 2011

Last time



- Differential equations as mathematical models of dynamical systems
  - Deriving the leaky integrator
- Matrix notation and operations
  - Applications to linear associators



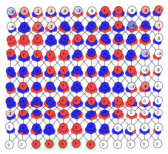
Session 2

simbrain

What is simbrain ?

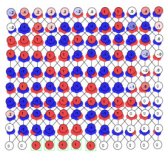
- Simbrain is an open source, java-based neural network simulator programmed by Jeff Yoshimi (Merced, Univ. of CA)
- It consists of three main components:
  - Network window (setting up neural networks)
  - World window (agents acting in a virtual environment)
  - High Dimension Visualisation (of state space vectors)

Why simbrain ?



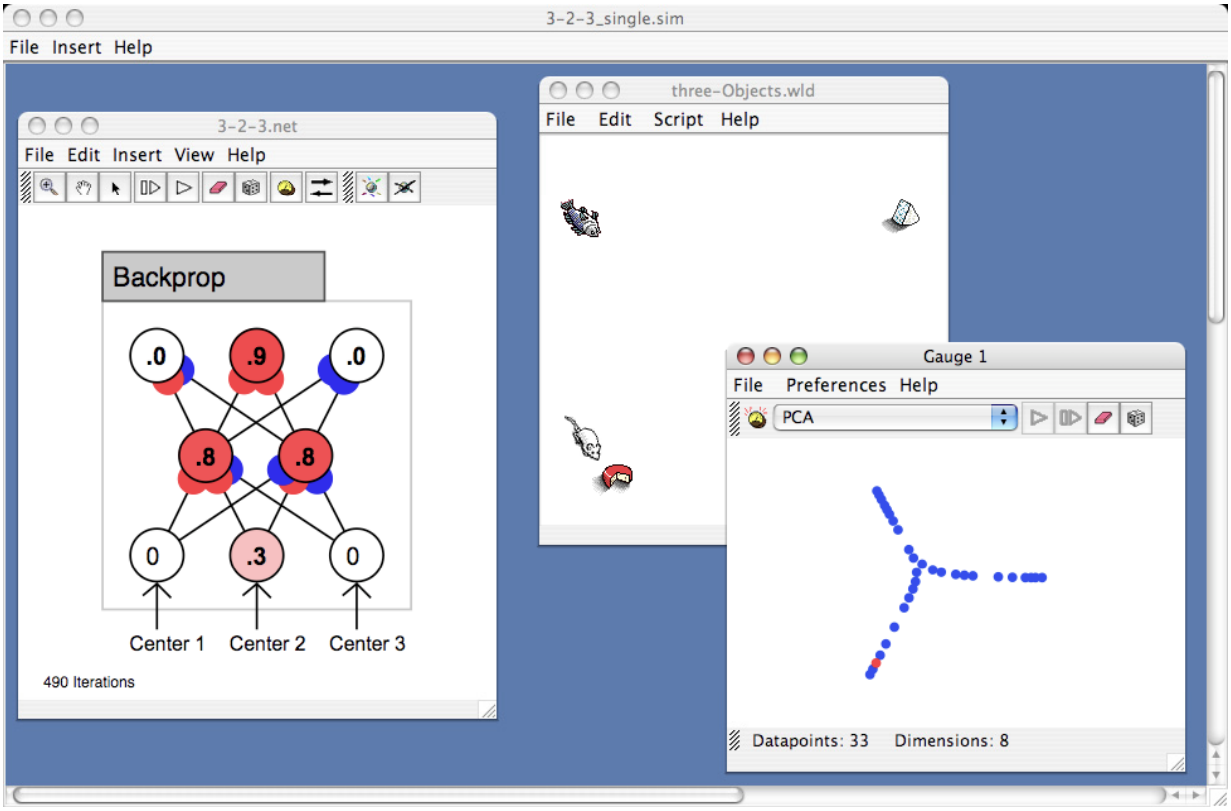
1. Suggestive, easy to use interface yet offering potent functionality and back-end
2. Ideal for educational purposes
3. Coupling of agents in virtual worlds to learning networks
4. Graphical representation of network state spaces

What will we do?

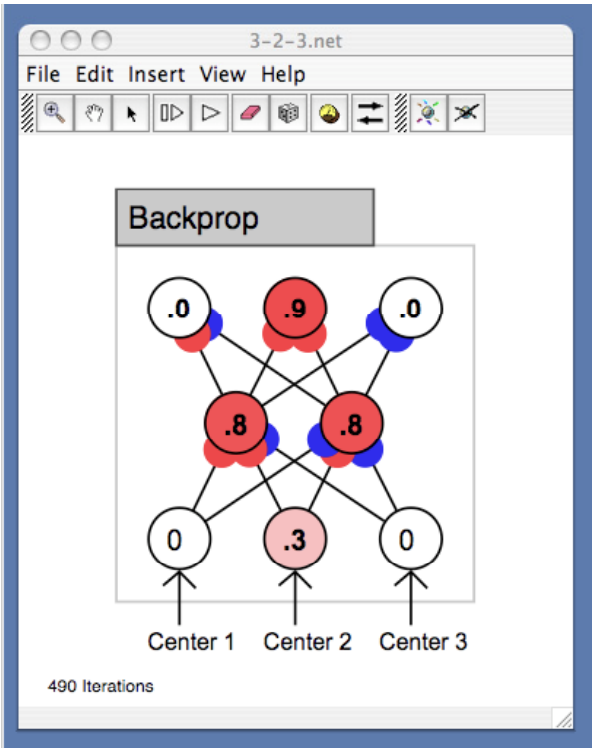


- Short introduction to interface
- Laboratories on
  1. Propagation of activation
  2. Vectors in NN; OR vs XOR
  3. Node rules and weights
  4. Hebbian Learning
  5. Linear Associators
  6. Sensori-motor control

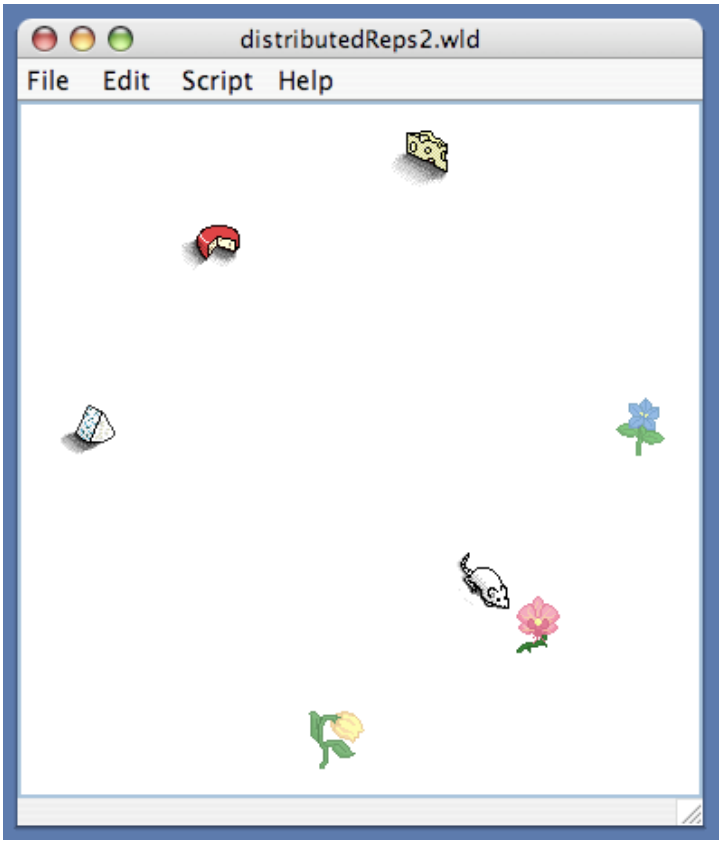
Workspace



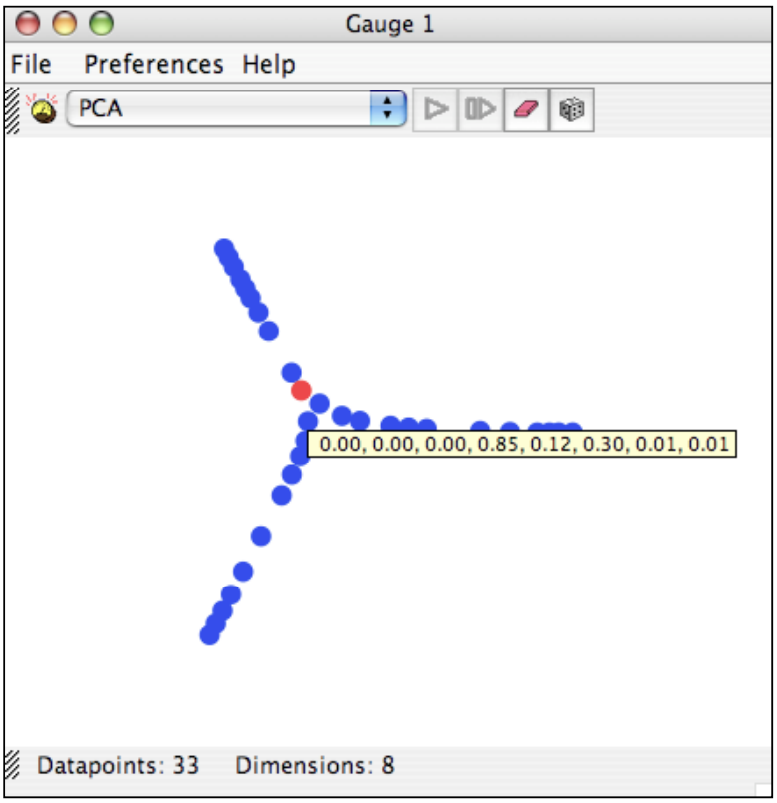
Networks



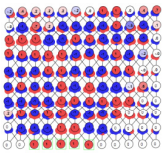
Worlds



State space representation



Installation instructions



1. Log in to your computer
2. Open up the Application Explorer and install Java 6 Update 24
3. Go to the tutorial homepage and download Simbrain.zip from the materials page
4. Extract the zip-file and double-click Simbrain.jar

And now to the labs!