Exam Neural Networks (Theory Part)
June 2, 2005

Please do not use any notes, books, slides, etc.

1. **Perceptron/Adaline**
   - (15 points) Describe in detail the perceptron architecture, neuron model and learning algorithm.
   - (10 points) What are the differences between perceptron and Ada-Line?
   - (5 points) Give an example of a boolean function that cannot be learned by a perceptron.
2. **Learning/Feed-Forward Neural Networks (FFNNs)**
   - (10 points) Give an example of supervised and unsupervised learning tasks.
   - (10 points) Show the architecture and the weights of a FFNN for the XOR function.
3. **Radial Basis Function Networks**
   - (10 points) Describe in detail the architecture of a RBF net and the network parameters.
4. **Self Organizing Map (SOM)/Competitive learning**
   - (10 points) Compare the k-means and the SOM algorithms.
5. **Hopfield Networks**
   - (15 points) Describe in detail the following components of Hopfield discrete NN: number of neurons, architecture, weights computation, NN execution (retrieval).
6. **Support Vector Machines (SVM)**
   - (15 points) Compare the perceptron and the SVM with linear kernel function.