Exam Neural Networks (Theory Part) December 22, 2005

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

1. **Perceptron/Adaline**
   - (10 points) Describe the Perceptron architecture and learning algorithm.
   - (10 points) Describe the Adaline architecture and learning algorithm.
   - (5 points) Compare Perceptron and Adaline.
2. **Learning/Feed-Forward Neural Networks (FFNNs)**
   - (5 points) Give an example of non-linearly separable classification task.
   - (20 points) Describe architecture and learning algorithm of the FFNN with one hidden layer.
3. **Radial Basis Function (RBF) Networks**
   - (10 points) Describe the architecture of the RBF net and the parameters of the network that have to be learned.
4. **Self Organizing Map (SOM)/Competitive learning**
   - (15 points) Describe in detail SOM: for what learning tasks it is used, what is its architecture and learning algorithm.
   - (5 points) What is the main difference between SOM and k-means?
5. **Hopfield Networks**
   - (10 points) Describe the discrete Hopfield network: architecture, network state, computation of weights and network execution.
6. **Support Vector Machines (SVM)**
   - (10 points) Compare the (linear) SVM and the Perceptron.