Exercise 2

Radial-basis Functions and Self Organization

Questions

3.1 Radial-basis function networks

- What is the lower bound for the number of training examples, N?
- What happens with the error if $N = n$? Why?
- Under what conditions, if any, does (4) have a solution in this case?
- During training we use an error measure defined over the training examples. Is it good to use this measure when evaluating the performance of the network? Explain!

4.1 Batch mode training using least squares

- How many units did you require to get down to a maximum (absolute) residual value of 0.1, 0.01 and 0.001?
- Give a good reason for the big difference in residual between 5 and 6 units for $sin(2x)$.
- How many units did you require, when approximating $square(2x)$, to come down to residual values of 0.1, 0.01 and 0.001?
- Approximating $square(2x)$ is a somewhat special case of function approximation since it is similar to another area of use for artificial neural networks. Which?
- Can you, with a suitable action (e.g. transforming network output), easy get down (for training values) to a residual value=0? What action? How many units did you require?
- Can an RBF network solve the XOR problem? If not, explain why not. If yes, explain how.