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A feed forward neural network is not able to solve time series problems. This is because such a structure doesn't have memory. Normal supervised learning structures map input patterns to the output. These structures work only if same input patterns have the same output in different time steps. However, such a condition is not fulfilled in time series scenarios. Therefore, some techniques have been used to overcome this problem.

In this example we use radial basis function (RBF) neural network to estimate a time series task. The input signal and the desired output signal can be seen in Fig. 1 .

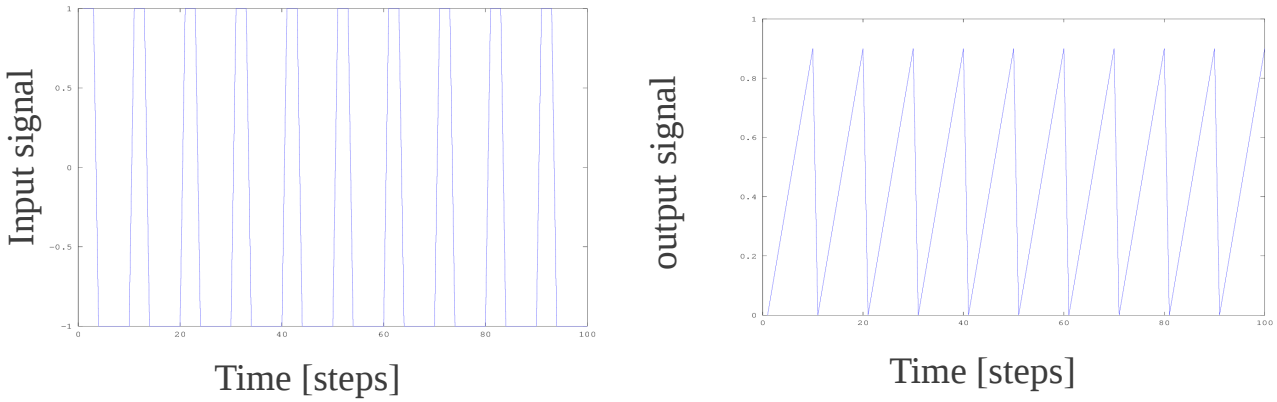

Fig. 1: The input signal and the output signal

To give the network the ability to predict time series, a time window has been used as an input for the network. This window covers a sequence of inputs (e.g. 10 or 20 time steps) and each input sample is fed to the network's inputs (the network has the same number of inputs as the input samples in the time window).

After training the network was able to learn the signal and to produce an acceptable approximation for the output signal. The RBF network's output signal (after learning) can be seen in Fig.2 . It can be seen that the RBF network approximates the desired output successfully. The used time window is 10 input samples. Two centers (Gaussian function centers) are used on each dimension of the RBF input space.

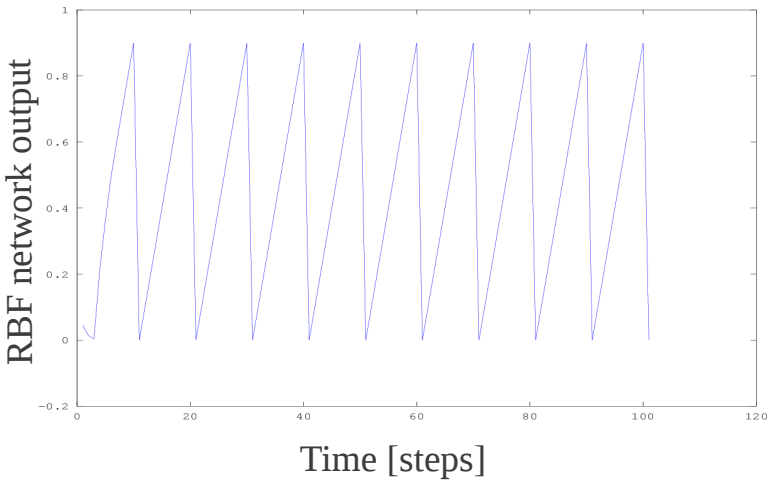

Fig. 2: The output of the RBF network after learning for the same input signal.