You are asked to write a MATLAB code to construct a recurrent neural network (RNN) for dealing with the following nonlinear system identification problem. The target is to use the RNN to approximate the following function:

,

where is the input, is the output, , , , and are used as another four inputs of the RNN. A total of 9000 time steps, including 5000 time steps of an *i.i.d* uniform sequence within the limits [-2, 2] and a sinusoid signal given by 1.05 × sin(*πk*/45) for the remaining training time, were generated to train the proposed network. After the network was trained, we used the following testing input signal to test the identification performance of the trained RNN.

In the final report, you should include the following contents:

1. Show the following information: 1) show the RNN network structure; 2) figure of the learning curve; 3) the weights of the trained RNN; 4) the biases of the trained RNN; 5) figure that show actual and ideal outputs in the testing procedure; 6) the mean square error (MSE) in the testing procedure.