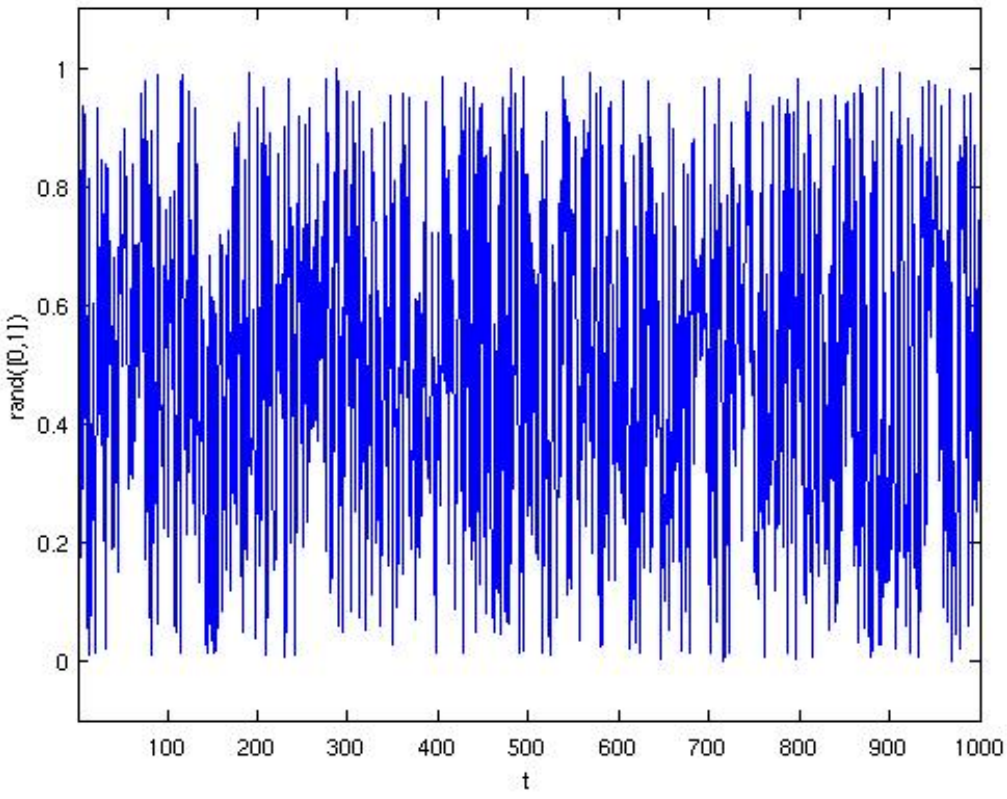
**Homework 2**

**Problem 4.1:**

Using *zeroth* on some artificial data sets , we need to predict values and see if the prediction errors depend on the prediction time.

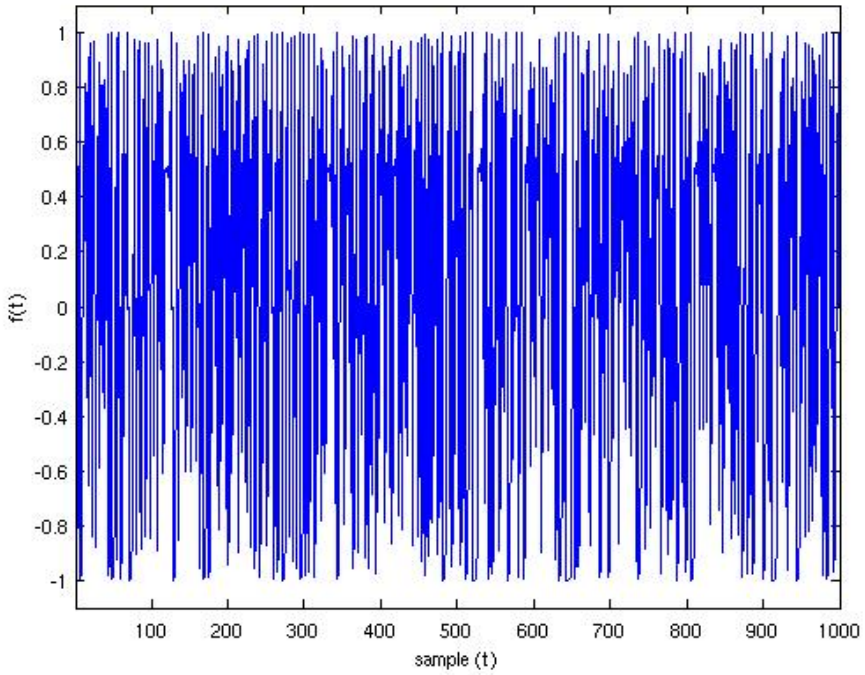
**Solution:**

Firstly, the uniform random variable is generated using rand function in MATLAB. The plot for the randomly generated time series is as follows:



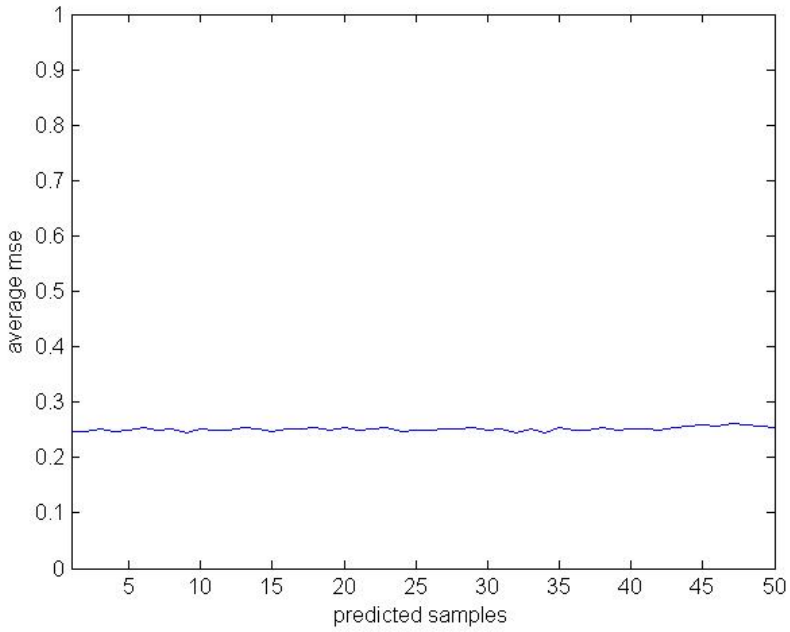

This is the plot of the uniformly generated random numbers in the range [0, 1]. The second is to use the Ulam map which is given by the following equation:

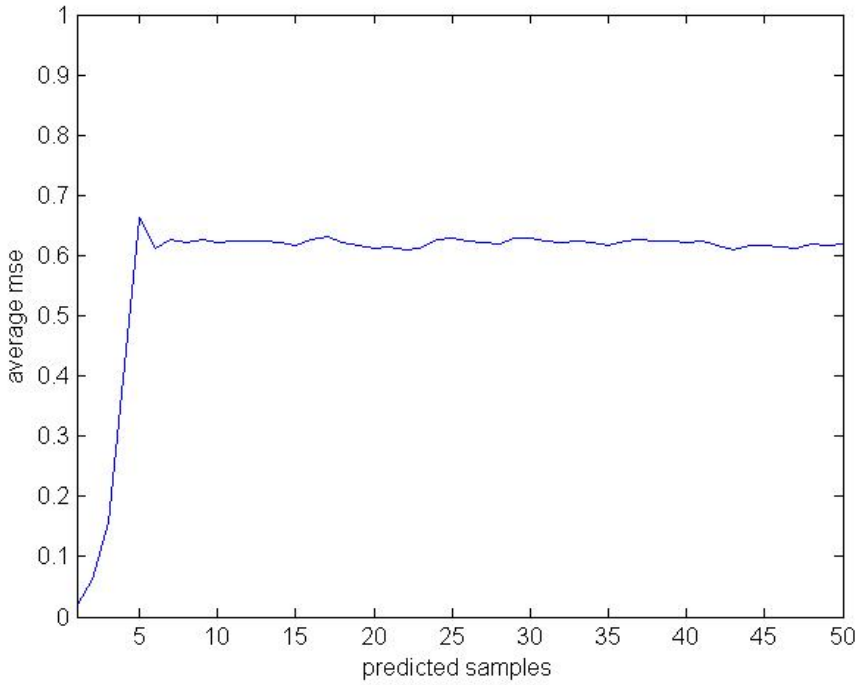
$x_{n+1} = 1-2x_n$ ^2 and $x_0 = 0.1$ The plot of the Ulam map is as shown in the plot below:




They both appear  to be noisy. The function *zeroth* is used for predicting the next 100 points.

The figure below shows prediction RMS for random numbers generated. It is less and stays at the same level.






The RMS for Ulam map increases in the beginning and drops down and remains at the same position.