Chapter 7

Neuronic Equations

Exercise

7.1 Giving any wanted sequence patterns of a network (For a net with N elements, the length of the sequence must be less than 2^N), write a program to get f_N, and then simulate the transition described by (5).

You can try the case when the sequence contain non-distinct patterns. Note that in general you can't guarantee the existence of Φ^{-1}, you can use the persudo-inverse instead.

7.2 Give any reason (do not need proof) why the expansion of Eq.1 below is true. This equation says that for any arbitrary function g_i and hard-limiting function σ, we can always expand them in η-space with a linear form.

$$x_{i,t+1} = \sum_{\alpha=0}^{2^N-1} f_{i,a}\eta_{a,t} = \sigma[g_i(x_i)]$$

(1)

7.3 Show that solving f_N of F_N by equations (9,10,11,12,13) in Chapter 7 Neuronic Equations in Lecture notes on Neural Networks is equivalent to solving a set of Diophantine equations.