

(Brest State Technical University 2009 Spring Semester: Course Practice)

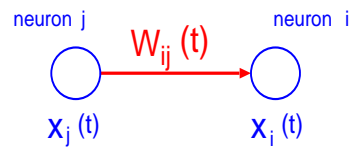
# Recurrent Neural Network

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This document is still under construction and was lastly modified on

April 8, 2009

# 1 Model and Method



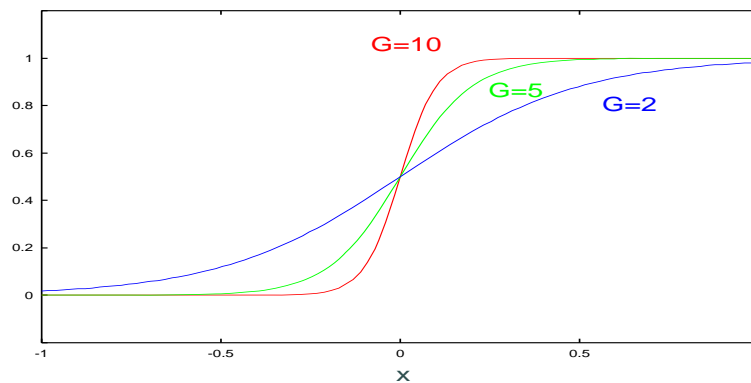
## 1.1 Continuous Neuron

Renew of states

$$x_i(t+1) = f\left(\sum_{j=1}^N w_{ij}(t)x_j(t) + I_i\right) \quad (i = 1, 2, 3 \dots, N)$$

Transfer function – Sigmoid

$$f(x) = \frac{1 + \tanh(Gx)}{2}$$



Update of weights

$$w_{ij}(t+1) = w_{ij}(t) + \eta x_i(t+1)x_j(t)$$

(where  $\eta = 0.01$  here, for example.)

## 1.2 McCulloh-Pits Neuron

Renew of states

$$s_i(t+1) = \operatorname{sgn}\left(\sum_{j=0}^{99} w_{ij}s_j(t)\right)$$

Transfer function

