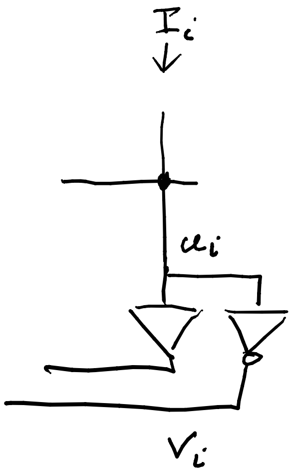
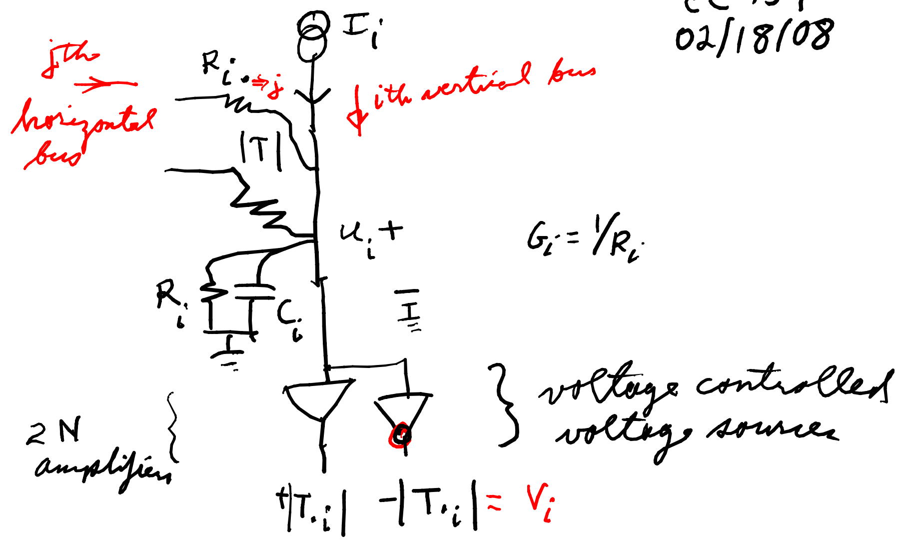
EE434
02/18/08





$G_i = 1/R_i$

$$C_i \frac{du_i}{dt} + G_i u_i = I_i + \sum_{j=1}^{N} G_{ij}(V_j - u_i) \qquad V_i = \pm g(u_i)$$

$$= I_i + \sum_{j=1}^{N} G_{ij} V_j - \underbrace{\sum_{j=1}^{N} G_{ij} u_i}$$

$\longleftarrow$ absent in Hopfield eq.(5)

He drops the last term:

$$C_i \frac{du_i}{dt} + G_i u_i = I_i + \sum_{j=1}^{N} T_{ij} V_j, \qquad V_j = \pm g(u_j) \text{ ; needs } u_i(0)$$

$i = 1, \ldots, N$

$\therefore$ have a 1st order nonlinear ordinary differential eqs,

I_i = DC, bias term
T_{ij} = weights = w_{ij}
input data = $u_i(0)$
output data = $u_i(t \to \infty) \Rightarrow$ need stable equilibria
(equilibria)

usually C_i & G_i are fixed by hardware, as are $g_i(\cdot)$, so the design is the choice of I_i & T_{ij}.