

EE610
08/30/06

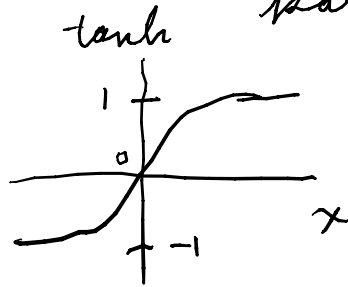
Look at

$$\dot{\hat{x}} = -y + e(1 - b \cdot \tanh(x))$$

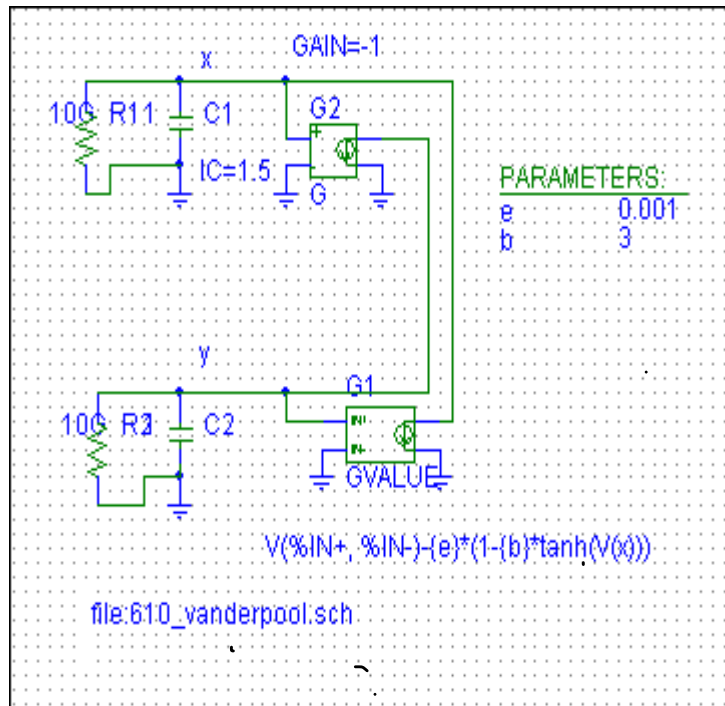
$$\dot{y} = x$$

e & b are
parameters

should have a
limit cycle

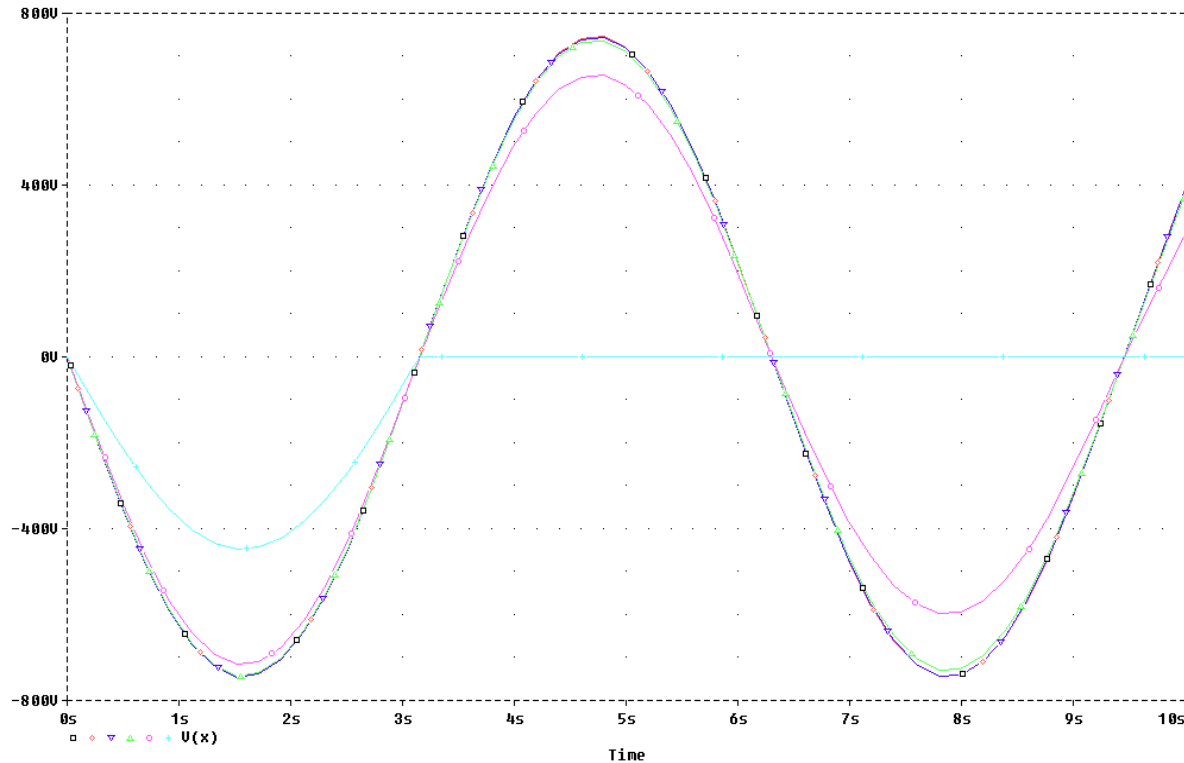


Put into PSpice, use Gvalue for the nonlinear VCCS
Note the large R's needed to avoid floating nodes.



To insert the figure
from schematic
"select" and then
"copy to clipboard"
from "edit"

run with several parameter values for b
 to place in a document, in Probe from "tools" select
 "copy to clipboard"; to get white background edit
 probe colors in the msim.ini file



Note that for these equations the $\tanh(x)$ term acts
 as a resistor while the constant term acts as
 a forcing function. To change the latter to a
 resistor, replace the $\perp$ by x and $e \rightarrow -e$ (to get $-R$), that is

$$\begin{aligned}\dot{x} &= -y - e(x - b \tanh x) \\ \dot{y} &= x\end{aligned}$$

This gives $\ddot{x} + e(1 - b\{1 - \tanh^2(x)\})\dot{x} + x = 0$, $b > 1$, $e > 0$

Then for small x , the conductance is $e(1-b)$ & for large x $e(1+b)$

