Problem #1

The nonlinear circuit element NL in Fig. (a) has the I-V characteristic shown in (b). (Sign conventions for V, I are as shown.) Find Vₓ with respect to ground.

Problem #2

Box #1 is represented by a Thevenin equivalent with VT₁ = 5V, RT₁ = 3000 ohms. For Box #2, VT₂ = -6V, RT₂ = 2000 ohms. The two boxes are connected together as shown.

a) Find the voltage at node A with respect to ground.

b) Find the power flow (in watts) between the boxes, in the direction from Box 1 into Box #2.

Problem #3
In the above circuit $V_0 = 10\text{V}$, $R_1 = 1000\text{ ohms}$, $R_2 = 2000\text{ ohms}$, $\rho = 5000$, beta = 0.7. Find the voltage at node A with respect to ground. (For ease of grading, please write equations using letter symbols, solve the equations, and then substitute numerical values as the final step.)

**Problem #4**

In the above circuit all the op-amps are "ideal".

a) Find $V_a$ (the voltage at node A with respect to ground):

b) Find $V_b$:

c) Find $V_c$:

d) Find $V_d$:

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