Simple_OTA_VCNR

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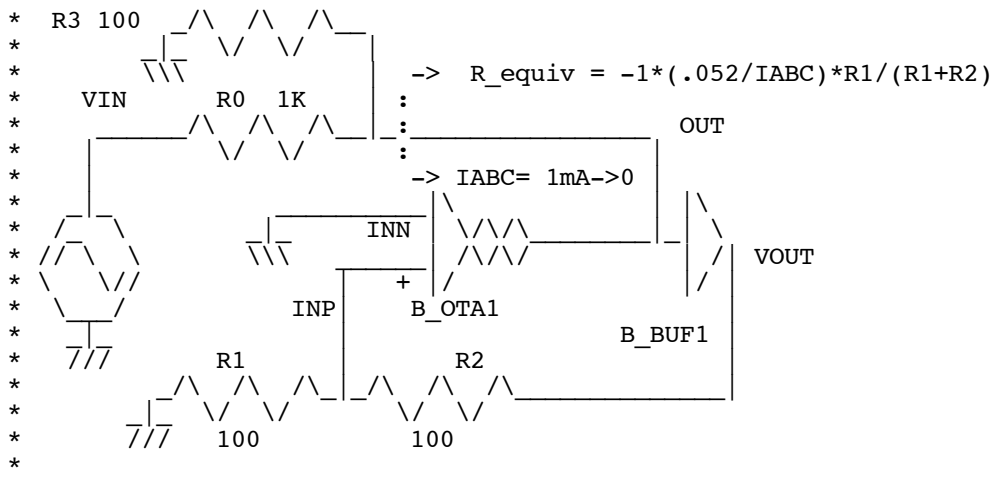

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```
VIN       VIN         0     SIN(    0    10m    1000    )
R0        VIN         OUT   1000
R1        INP         0     100
R2        VOUT        INP   100
R3        OUT         0     105
B_OTA1    OUT         0     I =    -1*v(VIABC)*tanh(( v(INP) )/.052)
B_BUF1    VOUT        0     V =     v(OUT)
V_Iabc    VIABC       0     PWL     ( 0 1m 10m 0 )
.tran     1u          10m   0       1u

.control
run
set pensize = 2
plot v(vin) v(out)
.endc
.end
```

==========END_OF_SPICE==========

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http://www.fileformat.info/convert/doc/pdf2txt.htm
This code works with winspice.

With a LM13700, any type of Voltage controlled Impedance can be made. This include Negative Impedances. In this application, a negative resistor is being constructed to cancel out the effects of R3 on the R0_R3 network.

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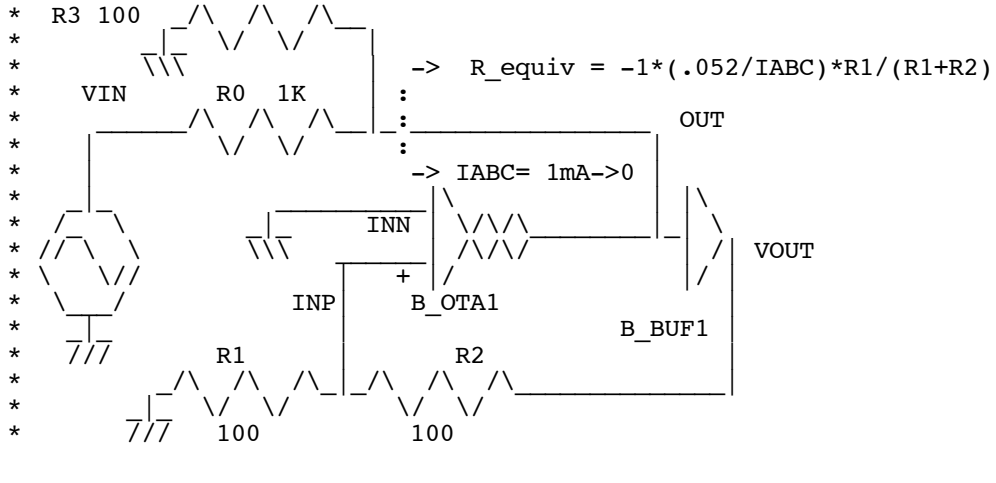
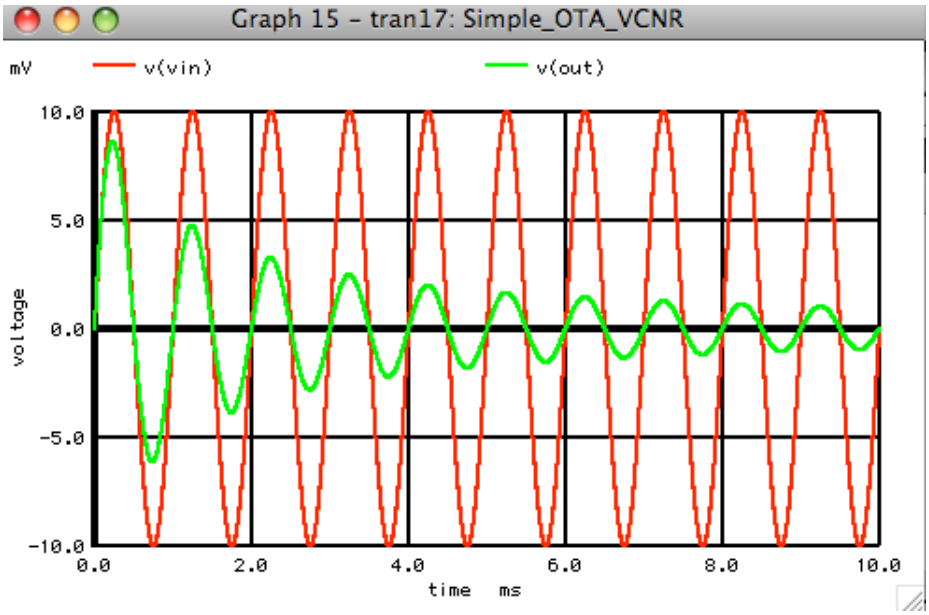


Negative resistors are a little unusual. This simulation imposes that R_equiv should always be larger than R3 which is a 100 Ohms. This being always true, the negative resistor will be increasing in value such that the parallel resistance at the OUT node will always be positive.

R3_||_R_equiv = -Requiv*R3/(-Requiv+R3)



At 1mA, the negative resistor cancels out most of the current in R3 and the cancelation decreases as IABC decrease.