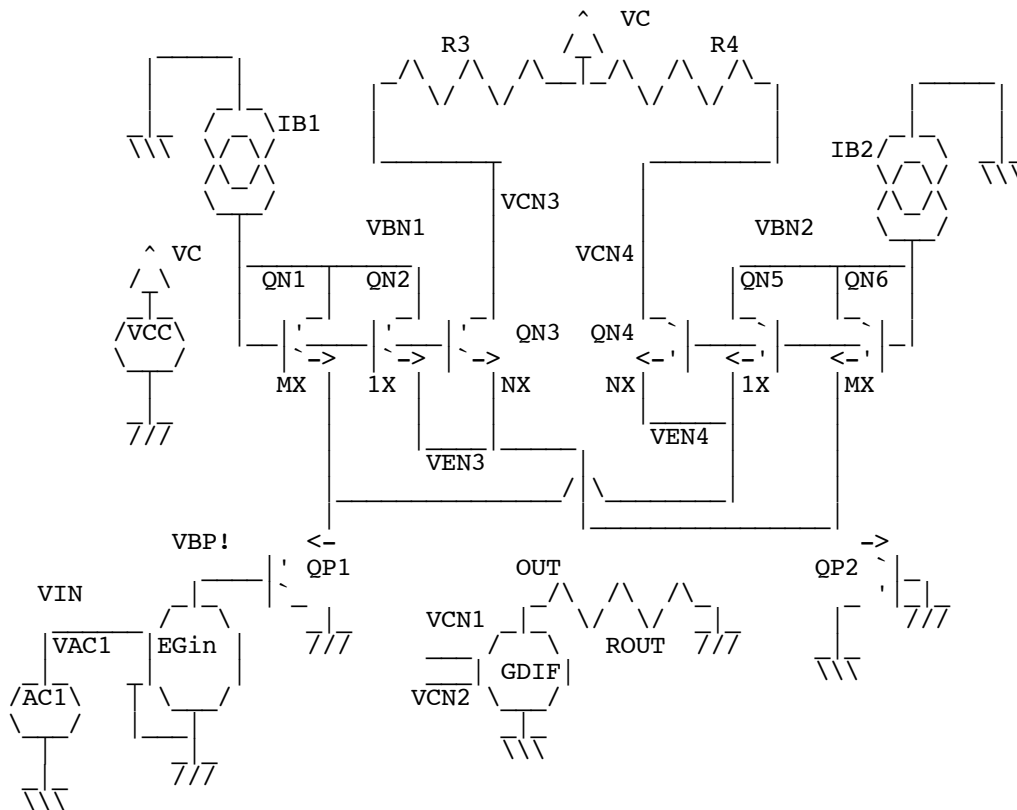


# AB\_BIAS\_DIFF\_Thd\_NX

\* www.idea2ic.com  
 \* dsauersanjose@aol.com 4/23/08



```
.OPTIONS GMIN=1e-18 METHOD=trap srcsteps = 1 gminsteps = 1
*=====
VCC VC 0 DC 10
VAC1 VIN 0 DC 0 SIN( 0 1 1000 )
IB1 0 VBN1 1u
IB2 0 VBN2 1u
QN1 VBN1 VBN1 VE4 NPN1 4.50
QN2 VBN1 VBN1 VE3 NPN1 1.00
QN3 VCN3 VBN1 VE3 NPN1 15.00
QN4 VCN4 VBN2 VE4 NPN1 15.00
QN5 VBN2 VBN2 VE4 NPN1 1.00
QN6 VBN2 VBN2 VE3 NPN1 4.50

QP1 0 VBP1 VE3 PNP1 1.00
QP2 0 0 VE4 PNP1 1.00
R3 VCN3 VC 1K
R4 VCN4 VC 1K
E_DIF OUT 0 VCN3 VCN4 1
ROUT OUT 0 1K
E_GAININ VBP1 0 VIN 0 1m
```

```
.control
tran 25u 5m 0 1u
plot out
echo "THD% versus VIN_vpk "
setplot new
set NameList = ( Nx8 Nx15 Nx25 Nx30 )
compose NxVals values 8 15 25 30
compose VinVals values 10m 30m 35m 40m 60m 70m 80m 100m 110m 120m 140m 150m
170m 185m 200m 250m
settype voltage VinVals
```

```

let          NoOfNx  =  length(NxVals)
let          NoOfVin =  length(VinVals)

begin
unset                interrupt
* =====Loop_Nx=====
let          j      =  1
while        (j      <=  NoOfNx )
let          Nx      =  NxVals[j-1]
alter       QN3  area =  $&Nx
alter       QN4  area =  $&Nx
set         thisName =  $NameList[$&j]
let         $thisName =  0*vector(NoOfVin)

* =====Loop_Vin=====
let          k      =  1
while        (k      <=  NoOfVin )
let          Vin     =  VinVals[k-1]
alter       e_gainin gain =  $&Vin
tran        25u          5m          0          1u
linearize
set         specwindow=  "blackman"
spec        200      8k      200      v(out)
let         thdsq =mag(out[9])^2 +mag(out[14])^2 +mag(out[19])^2 +mag(out[24])^2
let         thd_percent= 100*sqrt(thdsq)/mag(out[4])
echo       "$&unknown.Vin      $&thd_percent"
let         unknown.{ $thisName}[unknown.k-1] = thd_percent
repeat     3
destroy
end
if          ($?interrupt)
goto       bail
endif
let         k =          k + 1
endwhile
setscale   VinVals
plot       $NameList loglog title "AB_BIAS THD_% vs Vin_pK and Nx"
let         j =          j + 1
endwhile
label     bail
echo      "Done."
end
.endc

*=====
.model     NPN1     NPN(     BF=2100 VAF=216 )
.model     PNP1     PNP(     BF=2100 VAF=21 )
.end

=====END_OF_SPICE=====

```

To Covert PDF to plain text click below  
<http://www.fileformat.info/convert/doc/pdf2txt.htm>

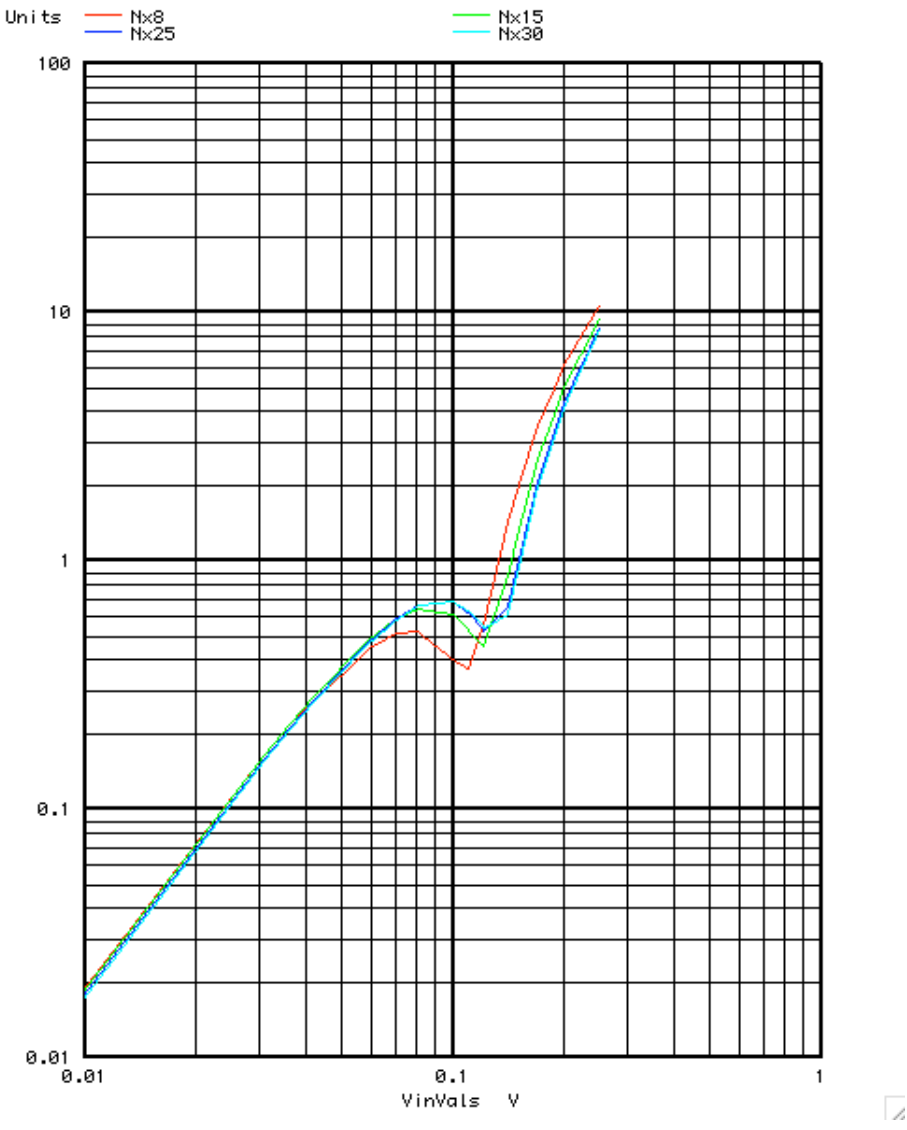
This simulation only works on MacSpice for now.  
Data in spice apparently gets stored in vectors which  
are ready to be plotted.

The invention below is an AB\_biased differential input  
stage which can put out more differential current than  
it draws DC wise. The current gain is defined by the  
N ratio. The A bias of the AB\_Biased aspect is defined by  
the M area ratio term.

\*



Graph 2 - unknown2: AB\_BIAS THD\_% vs Vin\_pK and Nx



It is the ability for the output current to be able to be larger than the DC current which gives the benefits of effective lower noise and offset. But just being able to handle larger input signal voltages has its benefits was well.

The AB\_Biased input stage needs to be put into a LM3080 OTA circuit to do an actual comparison in performances.