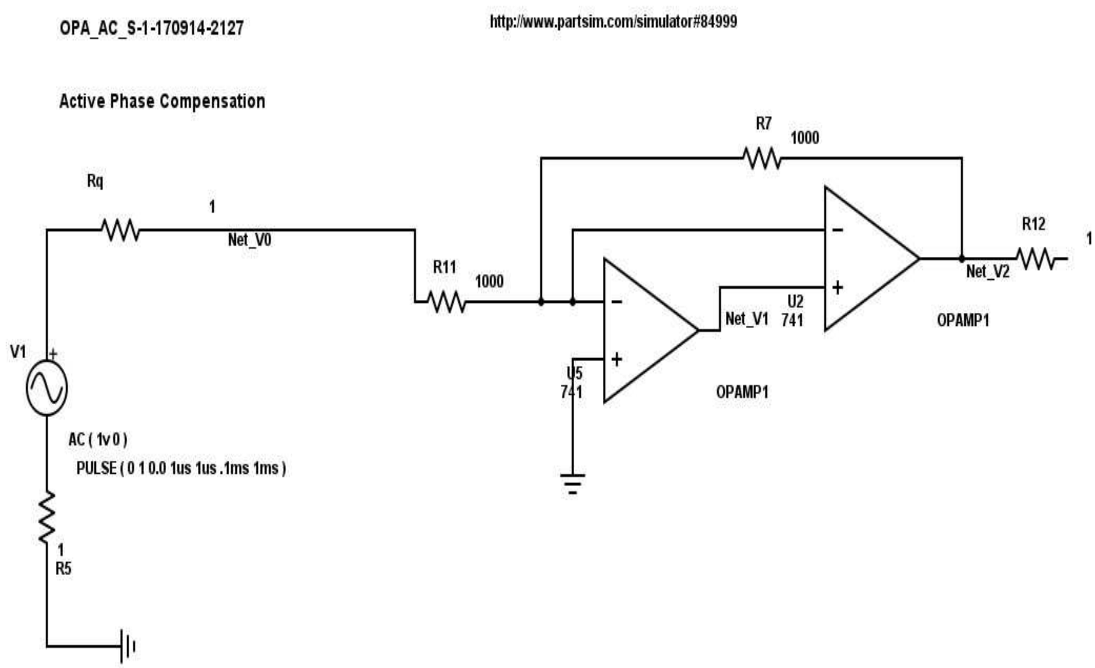
Chapter: GC_ET-OPA-AC

Circuit: Op Amp with Active Compensation for inherent F3 phase shift

Generously suggested by Dr. Barry Gilbert, Analog Devices, Inc.



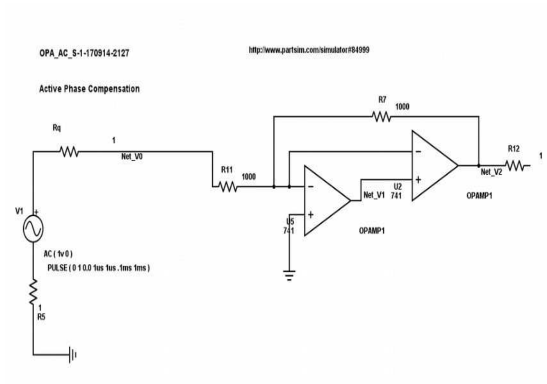
Transient Plot:

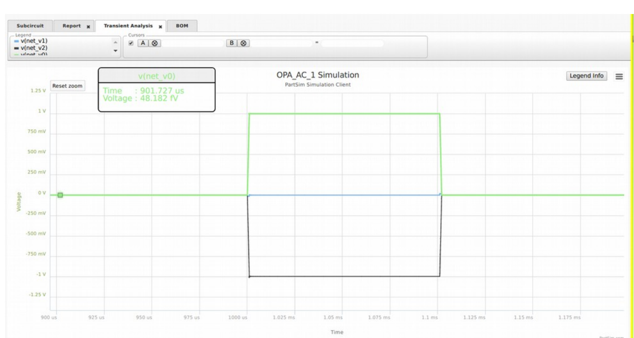
Results:

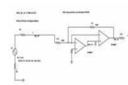
Controlled F3 phase shift.

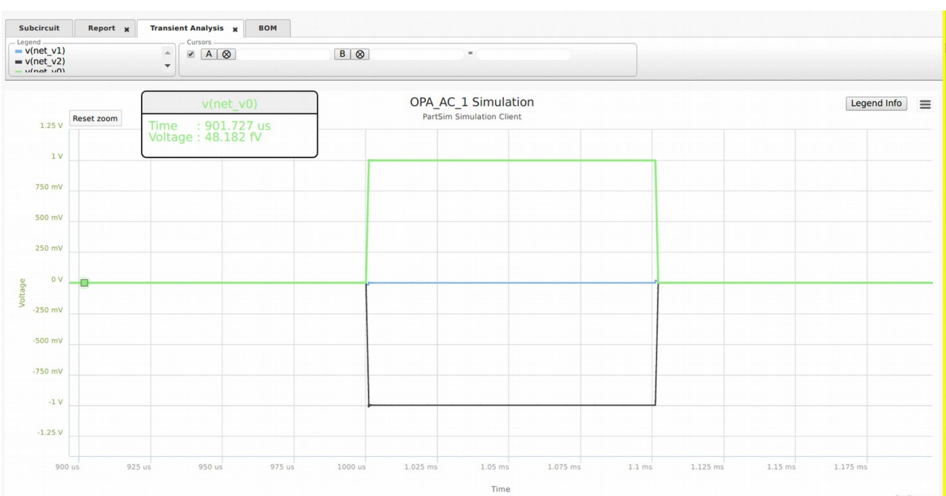
Circuit:

Op Amp with Active Compensation
for F3 phase shift inherent to OPA








Subcircuit
Report
Transient Analysis
BOM
Legend
v(net_v1)
v(net_v2)
Cursors
A
B
v(net_v0)
Time : 901.727 us
Voltage : 48.182 fV
OPA_AC_1 Simulation
PartSim Simulation Client
Legend Info
Reset zoom
1.25 V
1 V
750 mV
500 mV
250 mV
0 V
-250 mV
-500 mV
-750 mV
-1 V
-1.25 V
Voltage
900 us
925 us
950 us
975 us
1000 us
1.025 ms
1.05 ms
1.075 ms
1.1 ms
1.125 ms
1.15 ms
1.175 ms
Time
PartSim.com

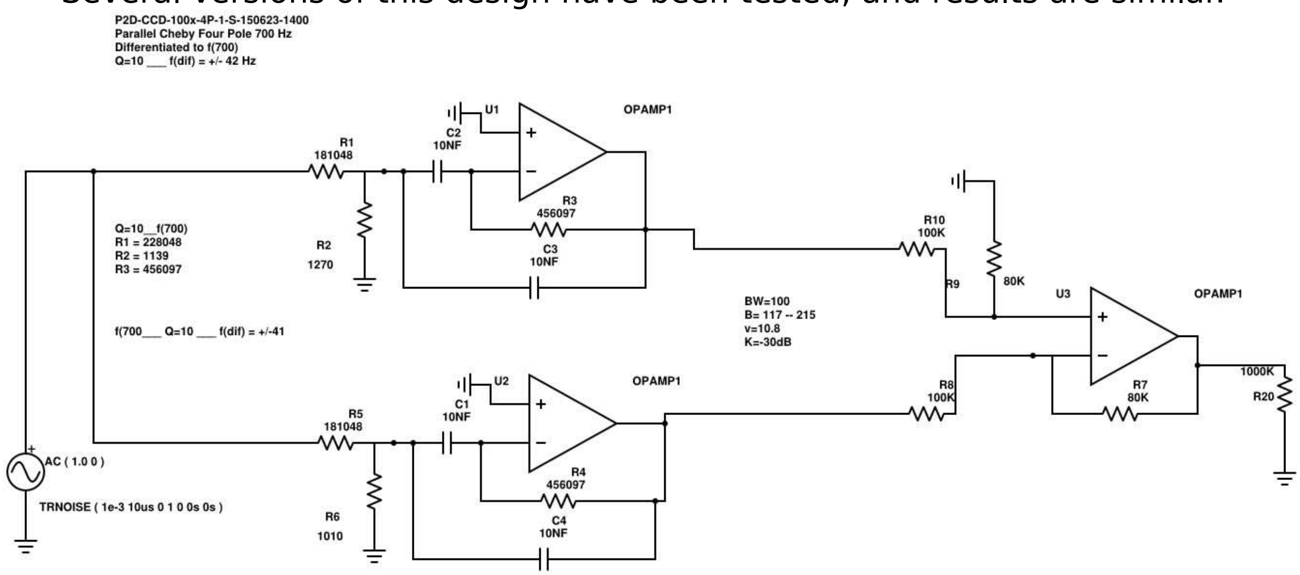
Chapter: **AFX_mFilter_4_P2A**

"P2” version A

Resonant Dual-Channel Audio Filters

Circuit : PC2D-CCD-100x-4P

***** The Final Narrow BandPass is BW=100 @ -3dB, and BW=150 @ -12dB.**
***** ‘v’ = 5**
***** Slope of bandpass is a variation of 5 Hz per dB of attenuation.**
*** Several versions of this design have been tested, and results are similar.



Bode Plot : PC2D-CCD-100x-4P

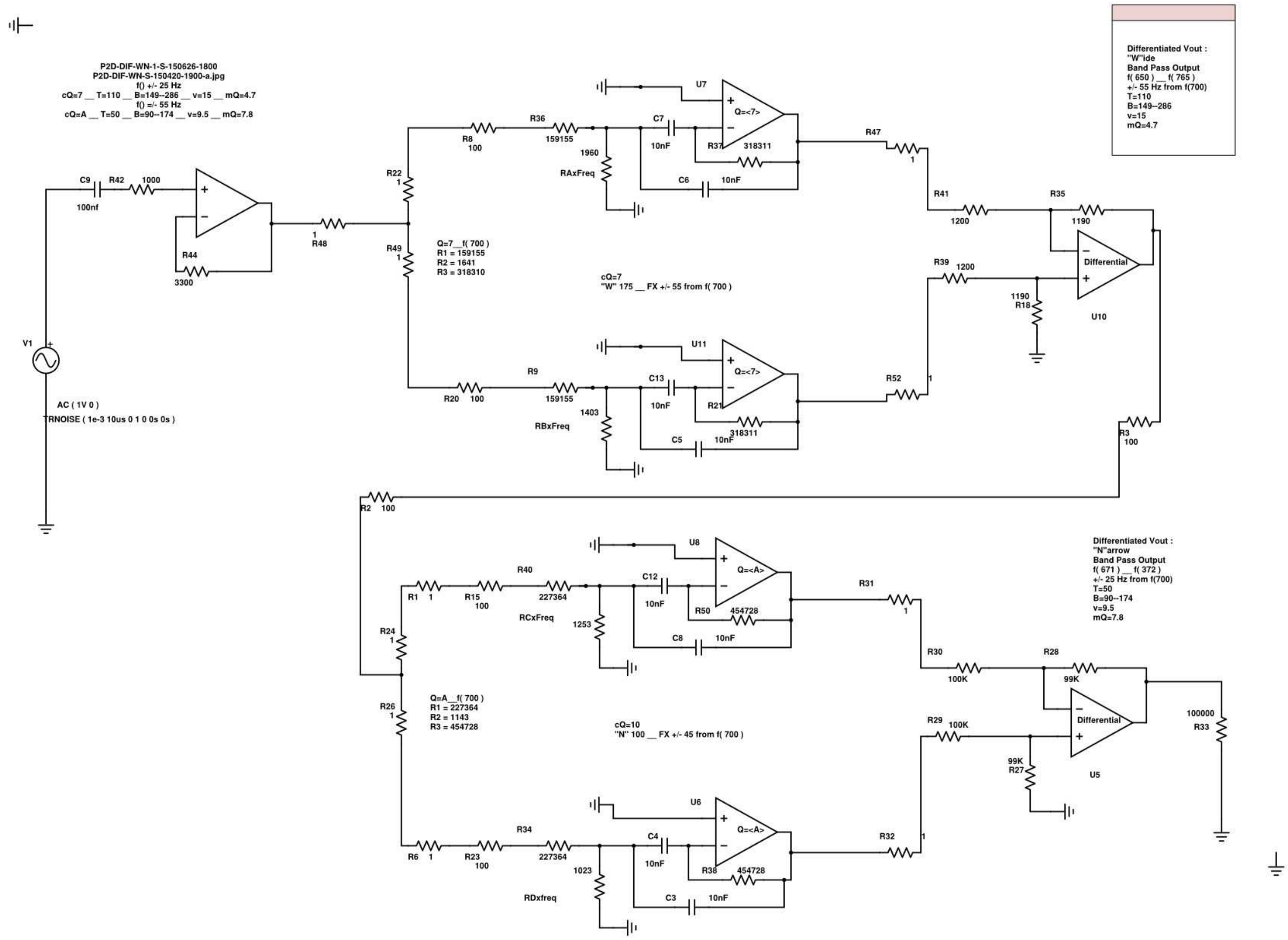
***** Narrow BandWidth of 100 Hz, with 7 Hz spread per dB attentuation.**

***** Notice the Flat-Top PassBand of this Narrow filter.**

***** Dual Notches are used to attenuate the sidebands.**

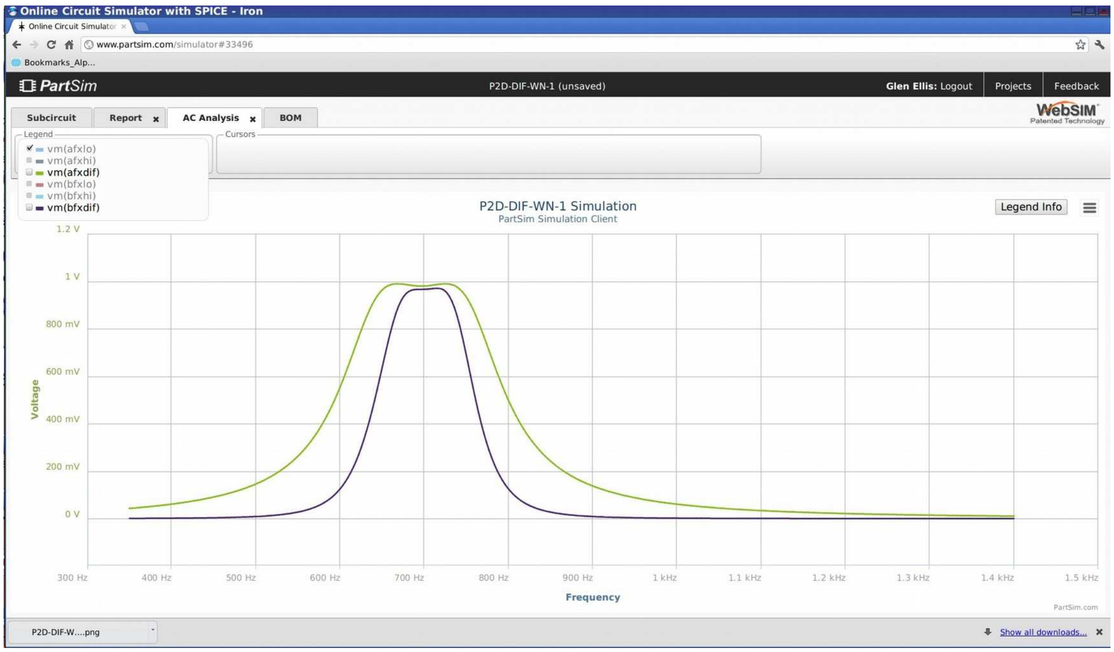
Circuit: P2D-DIF-WN-1-S

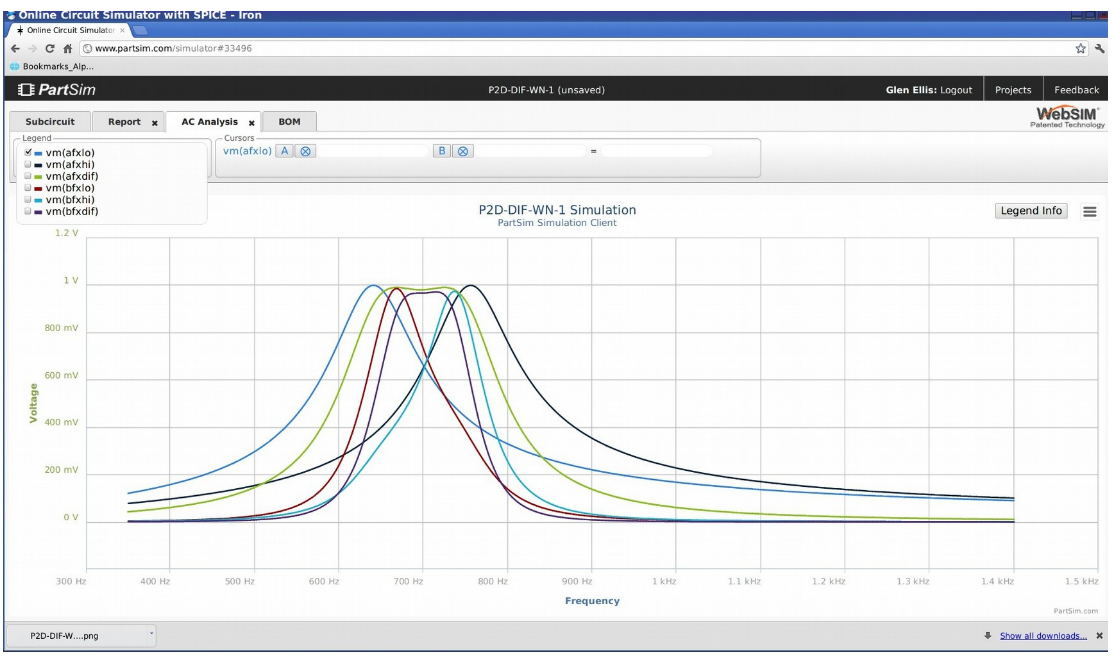
*** Narrow BandWidth of 90 Hz, with 7 Hz spread per dB attentuation.



Bode Plot : P2D-DIF-WN-1-S

***** Notice the Flat-Top PassBand of this Narrow filter.**
***** Developed into a "W"ide and "N"arrow circuit :**
BW=175Hz and BW=90Hz
**** Showing the f(0) Pass-Band and four auxillary peaks.**





****

****

Chapter : AFX_mFilter_5_P2B

"P2" version B

Resonant Dual-Channel Audio Filters

****

The designed advantages coming from the this approach are :

1) a flat-topped Passband, for easier capture of CW signals.
2) steeper sideband skirts,
(one circuit at 12 stages approachs Brick-Wall measurements).

The disadvantage is
greater complexity in tuning the many dual channel stages.

****

Circuit: **P2S-P442-Q53** Description: **P2S-P442-Q53**

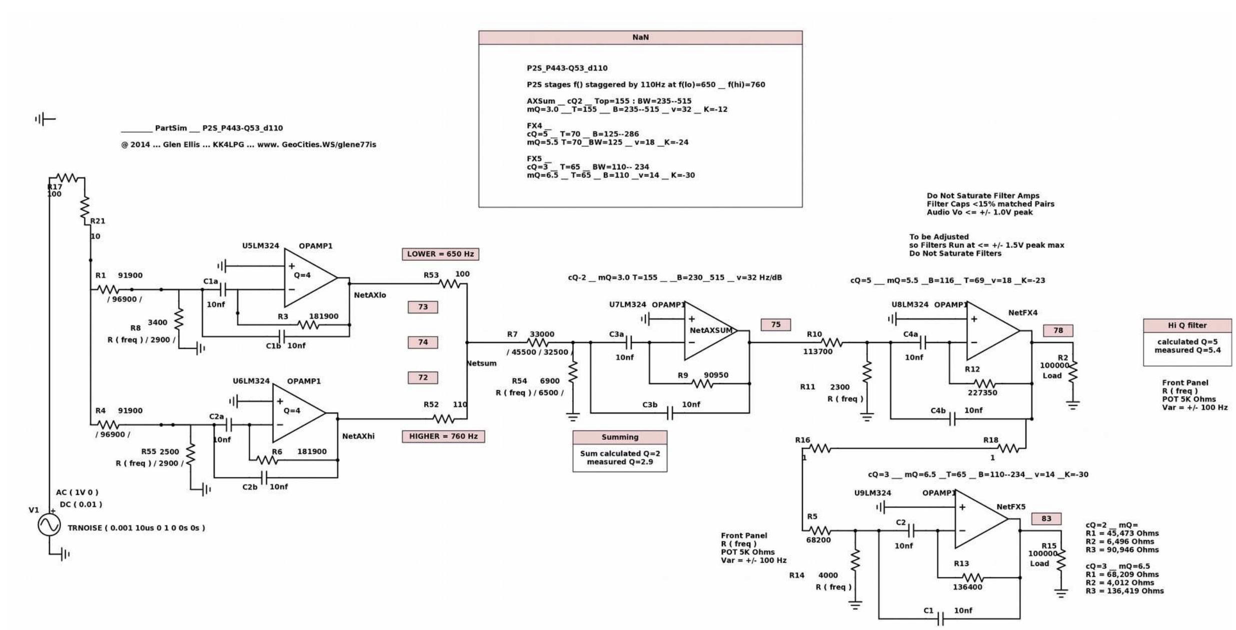
"P2S" Triplet Filter plus two "Q" stages for five stages.
This "P2S" circuit is applied as a Narrow CW Filter
using two Triplet Roof-Filters , and two Hi 'Q' filters,
totaling Five stages.

Filter, selectable "W"ide (BW=235) and "N"arrow (BW= 110 Hz)
SideBand skirts are very steep.
Dual Channels are 110 Hz apart.
This circuit works good for a 5 stage filter.

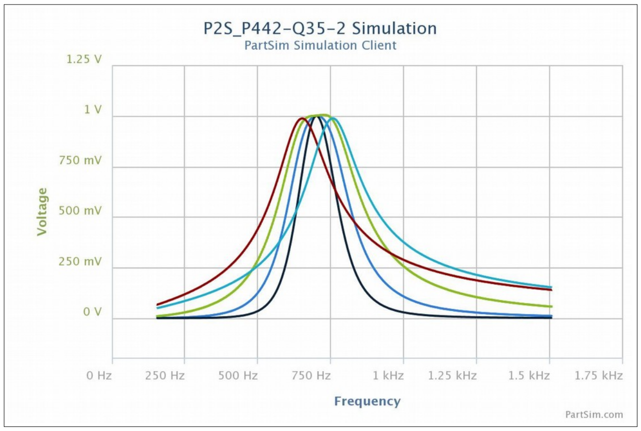
Results depend on exact amount of Dual-Channel Spread
and number of "Q" Filter Stages.

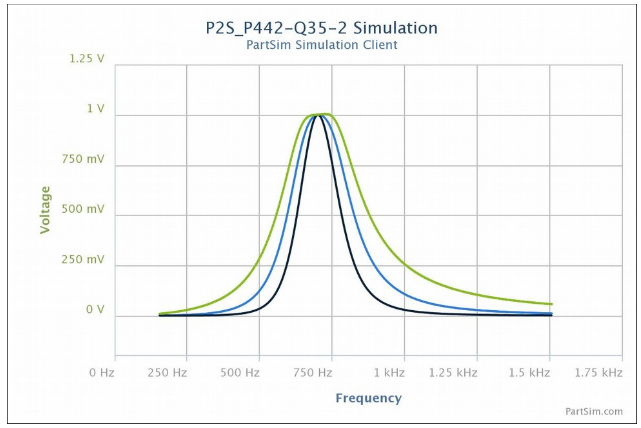
In each of the Triplet Groups, the OpAmp filters #1 and #2 are staggered (hi / lo of each other)

and #3 is a Summing stage with a Low "Q".
The result is a Flat-Top f(0) Bode plot,
and steeper than normal SideBand Skirts.
Variance = 14 Hz sideband spread per -dB attenuation.



Bode Plot :



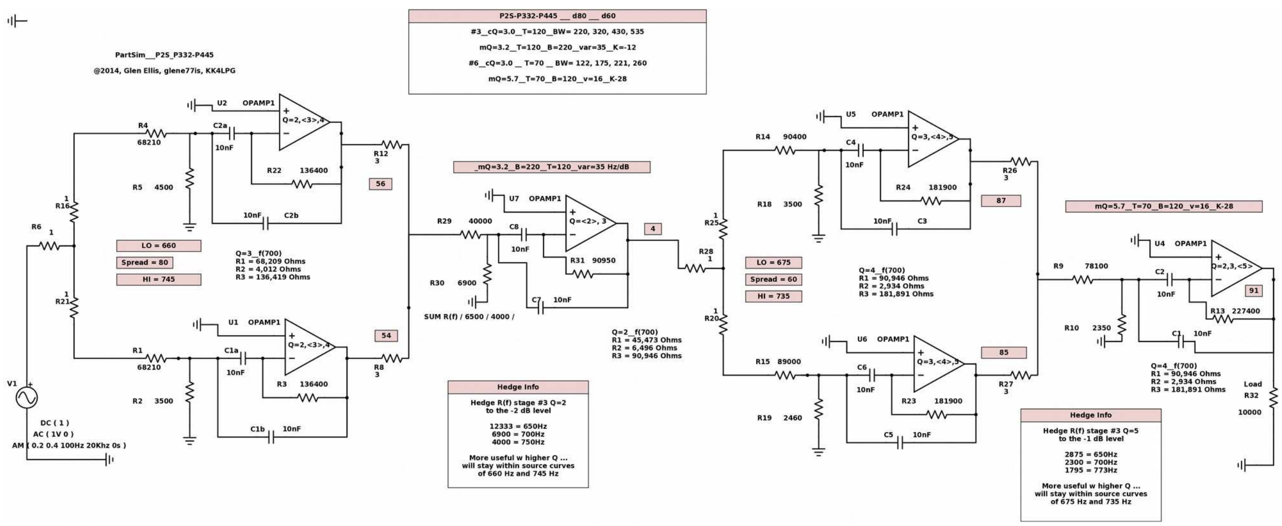


Top = 65Hz __ at -1dB and BW = 110 __ at -3dB
Variance = 14 Hz per dB attenuation __
Last Stage Filter: measured "Q" = 6.5 __max

****

Circuit: **P2S-P332-P445**

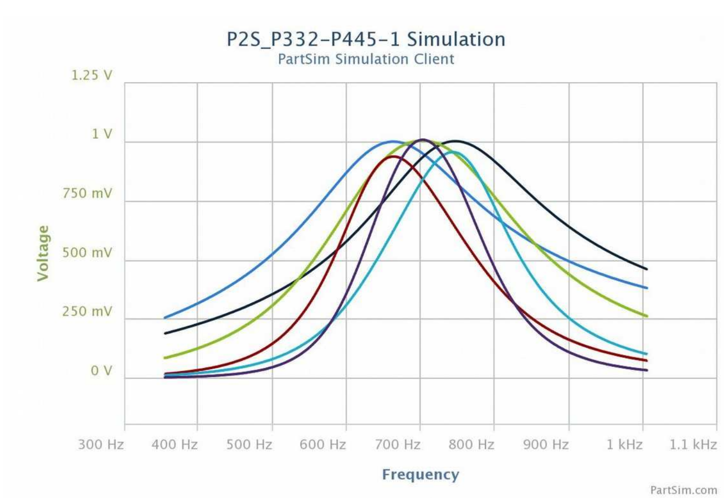
This circuit is developed as a Narrow CW Filter in six stages.
Two sets of Dual-Channel filters.



Results depend on specfic amount of Dual-Channel Spread and "Q".

Wide mQ=3.0__T=120__BW=220__var=35__K=-12
Narrow mQ=5.7__T=70__BW=120__var=16__K=-28

measured "Q" = 5.7 __ Top = 70Hz __ BW = 120 __
Variance = 16 Hz per dB attenuation __
Kilo = -28dB at 1000 Hz

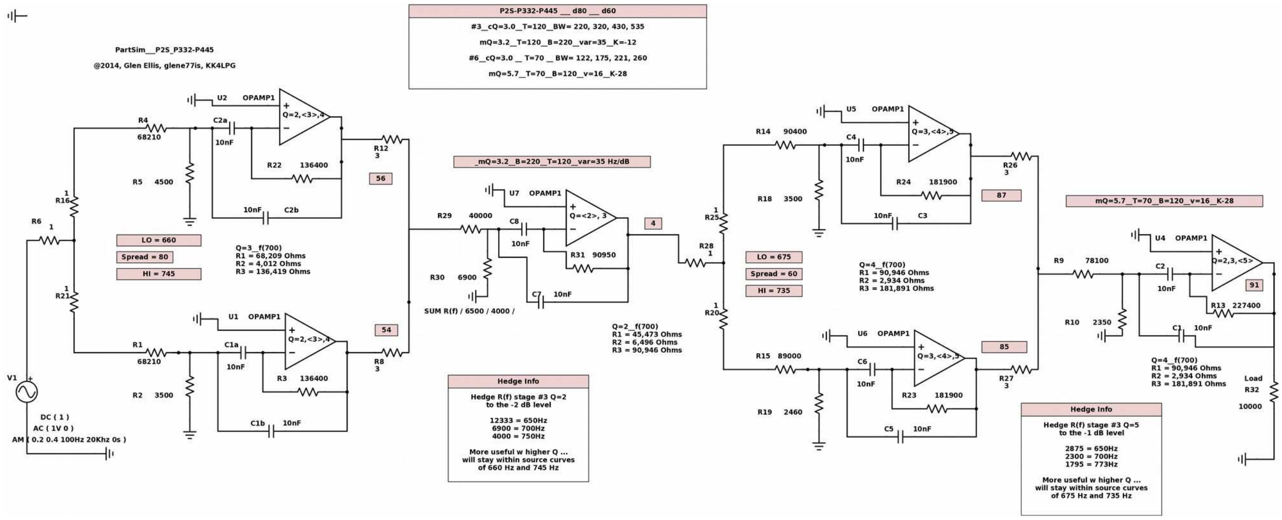


In each of the Triplet Groups, the OpAmp filters #1 and #2 are staggered (hi / lo of each other)

and #3 is a Summing stage with a Low "Q".
Staggers here are +/- 45Hz for First Triplet, and then +/- 30Hz for Second Triplet.

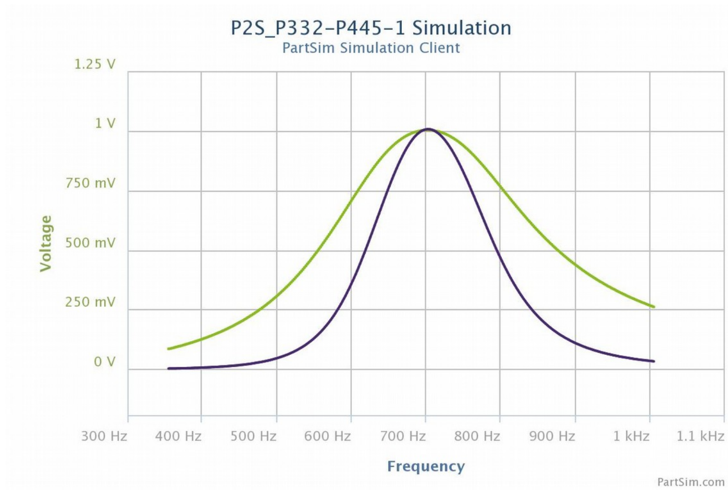
The result is a Flat-Top Bode plot,
and steeper than normal SideBand Skirts.

Circuit: P2S-P332-P445



where the P2S triplet filter is "Q" = 3, 3, 2, and "Q"=4, 4, 5" .

Resulting Final Top BW at -1 dB is 70 Hz (Flat).
Resulting Final BandWidths are 120, 195, 240, 285 at the -3dB, -6dB, -9dB, -12dB levels.
Resulting Final Variance of BandWidth is 16 Hz per dB attenuation (Extremely Steep).



Resulting signal level of K = -28 dB at 1000 Hz. Results depend on amount of Dual-Channel Spread. No precision components required.
Caps are +/- 5%, f() is corrected by the MFB circuit at R(freq) for each stage.

The P2SQ Triplet Filter #1 is caculated as Q=3,3,2, and measured as Q= 3.0, 3.0, 4.0 , due to the cumulative effect of sequental stages.

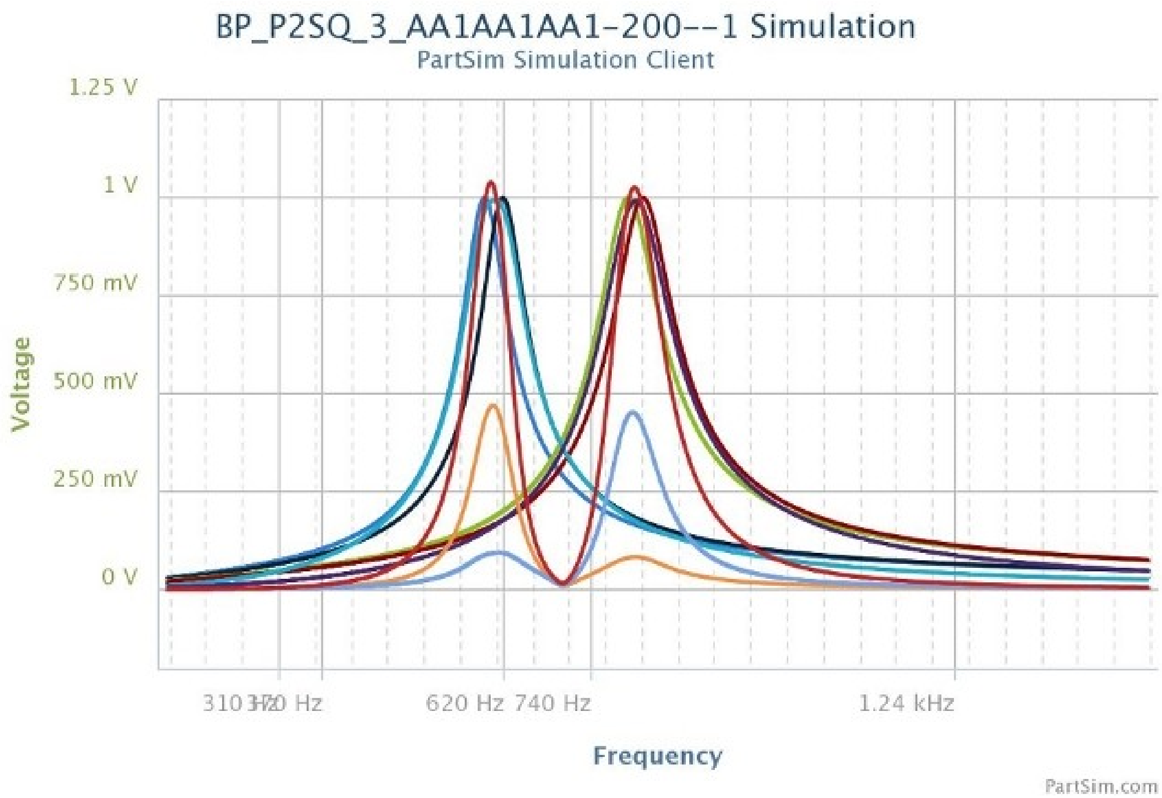
The P2SQ Triplet Filter #2 is caculated as Q=4,4,5, and measured as Q= 4.0, 4.0, 6.0 ,
due to the cumulative effect of sequental stages.

Stage #1 & #2: R(freq) is R5 and R2 for the base parallel filters.
Stage #3: R(freq) is R30, for the Summing "W"ide filter.

****

Circuit: **P2S-3-AA1A1AA1** **special RTTY Filter***

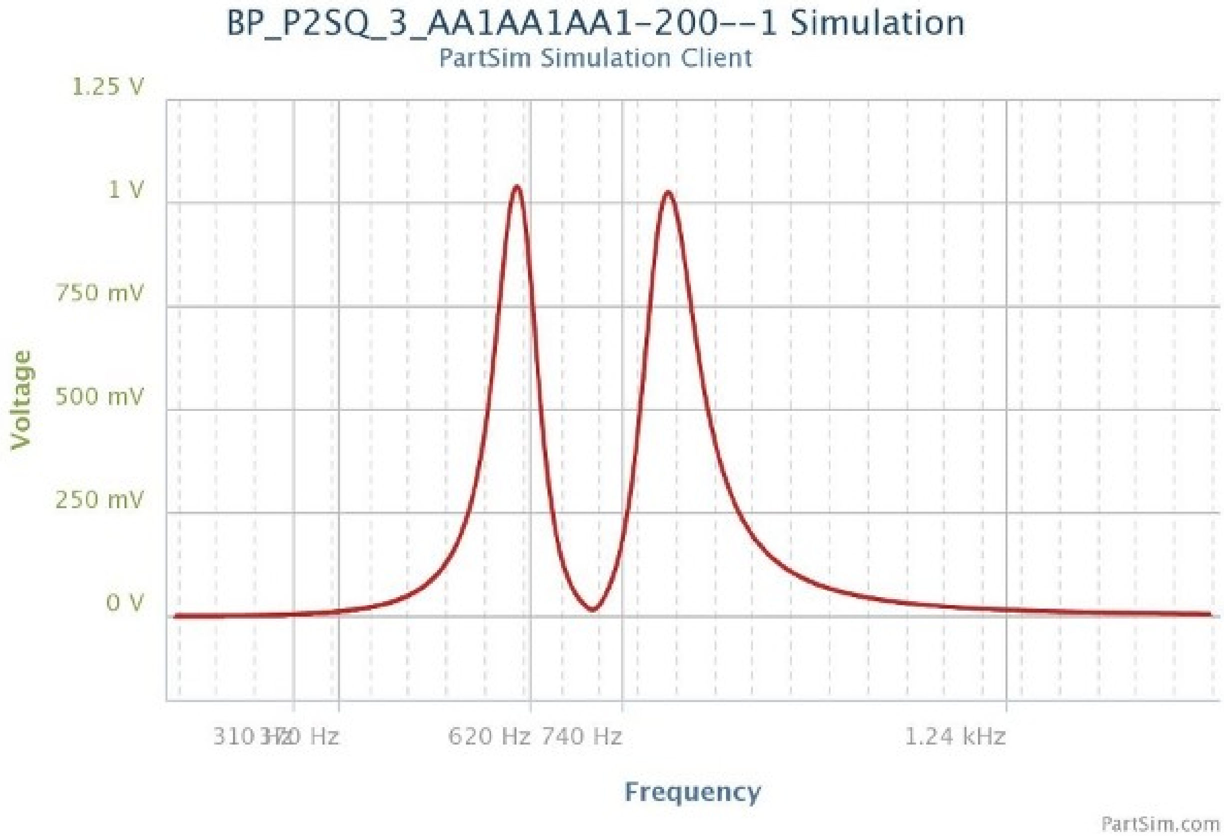
This "P2" filter is applied as an Audio R.T.T.Y. Filter, at 600 Hz & 800 Hz.
The RTTY Twin-Peak has been phase inverted and acts as a Twin-Notch around the narrow C.W. filter. (see below)



Designed for WB8YYY. * Cumulative Filter Bode for RTTY Filter, all phases showing :**

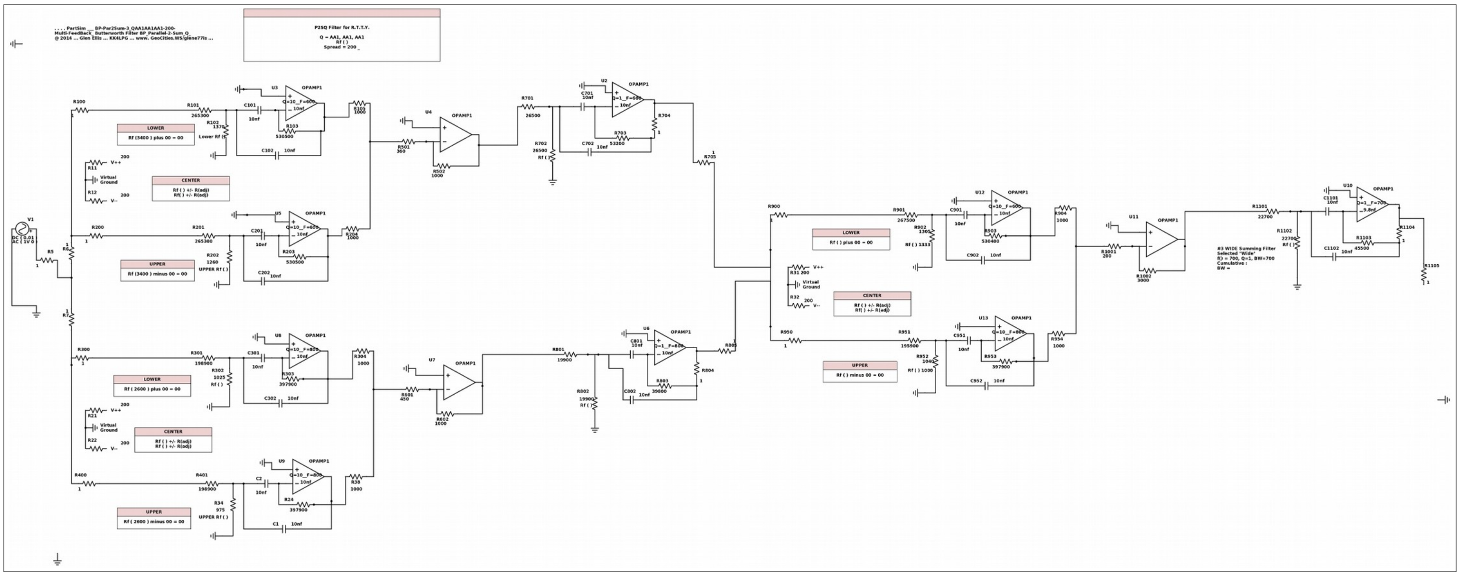
P2S-PAA1AA1AA1

***** RED trace shows -48 dB Notch between RTTY peaks :**



Circuit: P2S-PAA1AA1AA1

***** Schematic of RTTY audio filter**
(12 filter stages). Designed for WB8YYY.



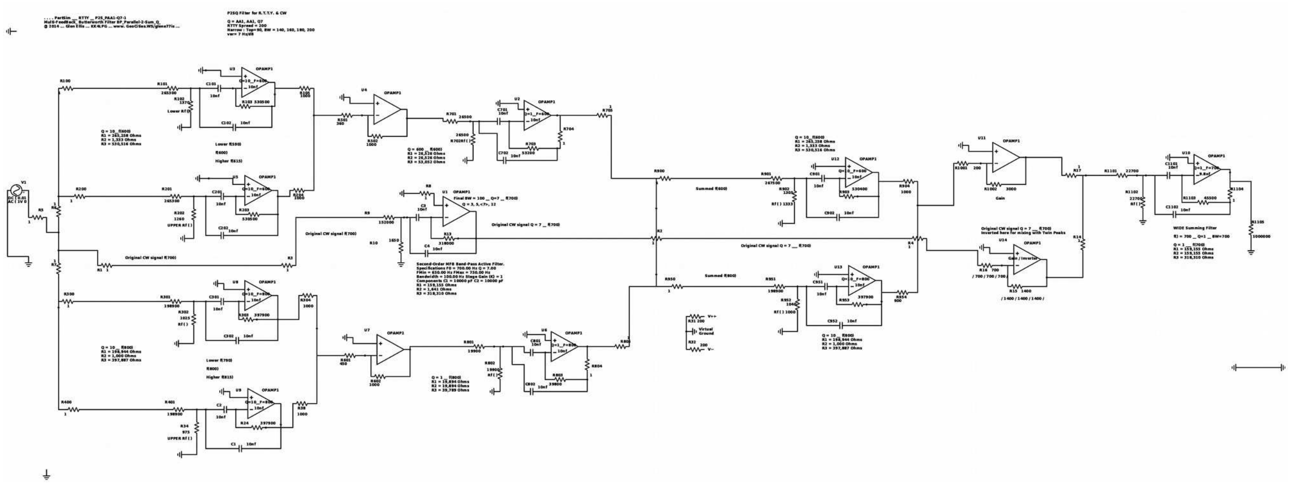
Circuit: **P2S-PAA1-Q7**

an Audio C.W. Filter, Final Q=7, at 700 Hz,

Design goal was to broaden the Top of the BandPass at the -3dB level and Steepen the SideBand Skirts between -3dB and -30 dB.

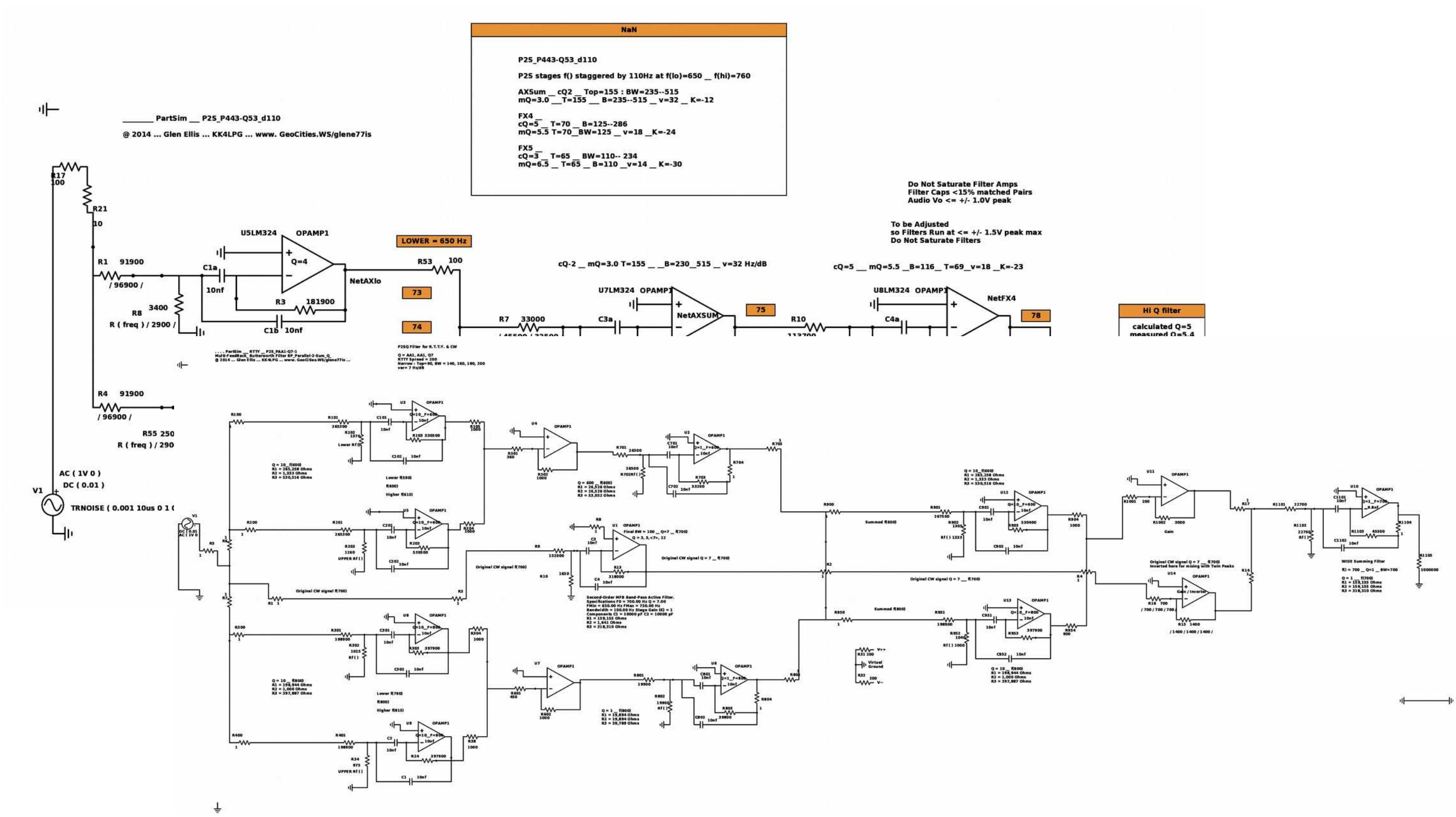
Here, the Twin-Peak signal is phase inverted and acts as a Twin-Notch when summed around the narrow C.W. signal.

This Q=7 BandPass is about 100 Hz wide at -3dB,
Extremely steep skirts,
spreading at 7 Hz per dB attenuation down to -30dB.



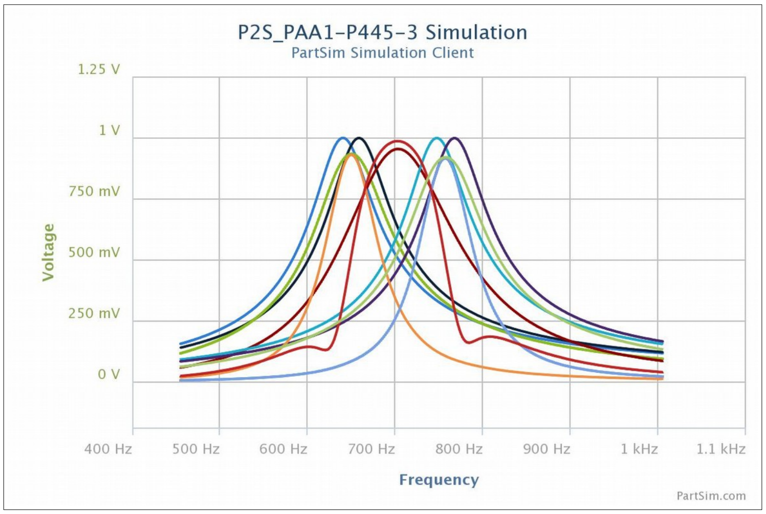
Circuit: **P2S-PAA1-445-Q7**

Schematic (18 stages)
Design goal was to broaden the Top of the BandPass,
and Steepen the SideBand Skirts.
Documentation embedded : P2S-PAA1-P445
This filter circuit has aprox. BW=90 and Sidebands Extremely Steep,

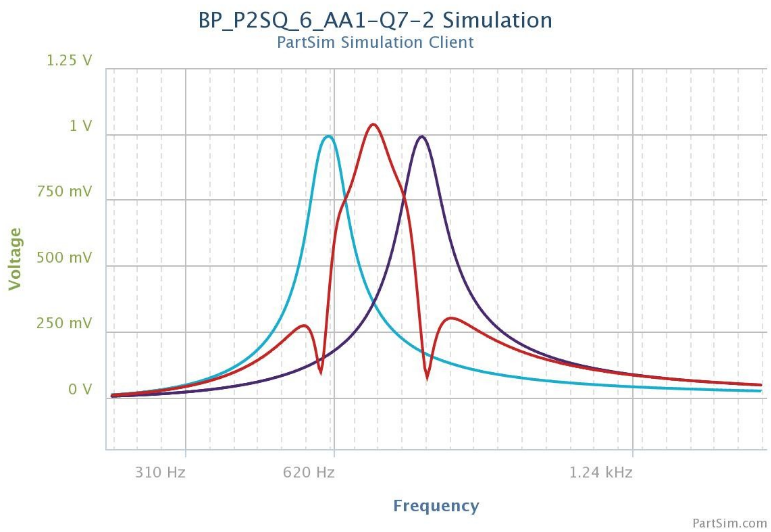


Bode: **P2S_PAA1-P445-3_**

Final Stage Measurements :
BW=100,120,130,145 @ -3dB,-6dB,-9dB,-12dB,
Variance=5 Hz per dB and K=-24 dB

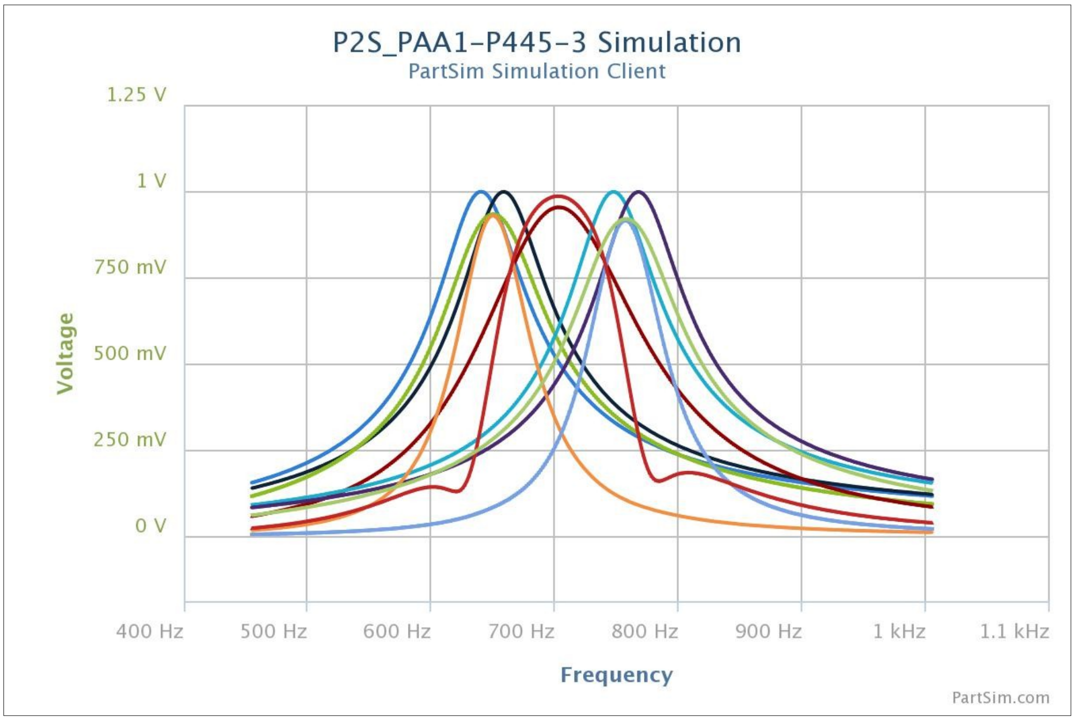


P2SQ_6_AA1_Q7-2 : Magnitude plot.
The sideband steepness has a rating a v=5 rating, K=-27
and will sound like a brick wall to signals outside of BP=120Hz.



P2S_PAA1-P445-3 : Final Stage Measurements : Bode plot

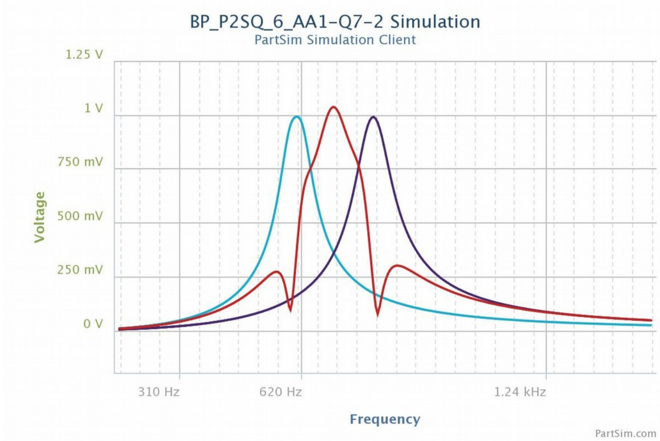
BW=100,120,130,145 @ -3dB,-6dB,-9dB,-12dB
Variance=5 Hz per dB and K=-24 dB



The Dark-Red trace is the broader original CW signal
The Light-Red trace is the narrow Double-Notched PassBand Signal.

Not a Club Kit Project !
Tuning is very critical.
Interaction between the the (inverted) Notch Peaks is always nearby.

P2SQ_6_AA1_Q7-2 : Magnitude plot.
The sideband steepness has a rating a v=5 rating, K=-27
and will sound like a brick wall to signals outside of BP=120Hz.



****

****

Chaper: AFX_mFilter_6_P2C

"P2” version C

Resonant Dual-Channel Audio Filters

The designed advantages coming from the this approach are :
1) a flat-topped "W"ide Passband, for easier capture of CW signals.
2) a "N"arrow Passband with extremely steep sideband skirts,
3) uses Parallel Filters followed by un-tuned Differential stages
4) if followed by a MFB Q=7 stage, then a single R(freq) can vary the f() narrow passband frequency.
.

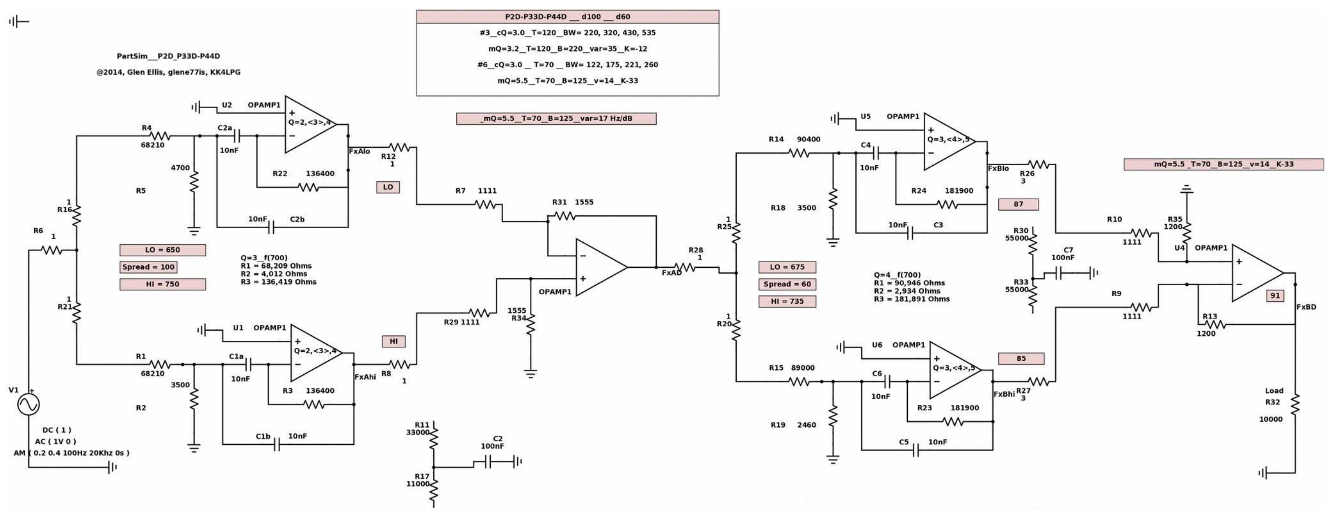
****

Note: In the following diagrams, R2 to Virtual Ground is the R(freq) for adjusting f(center)
Note: the -3dB level is equivalent to the 700 mV level in these Bode Plots.

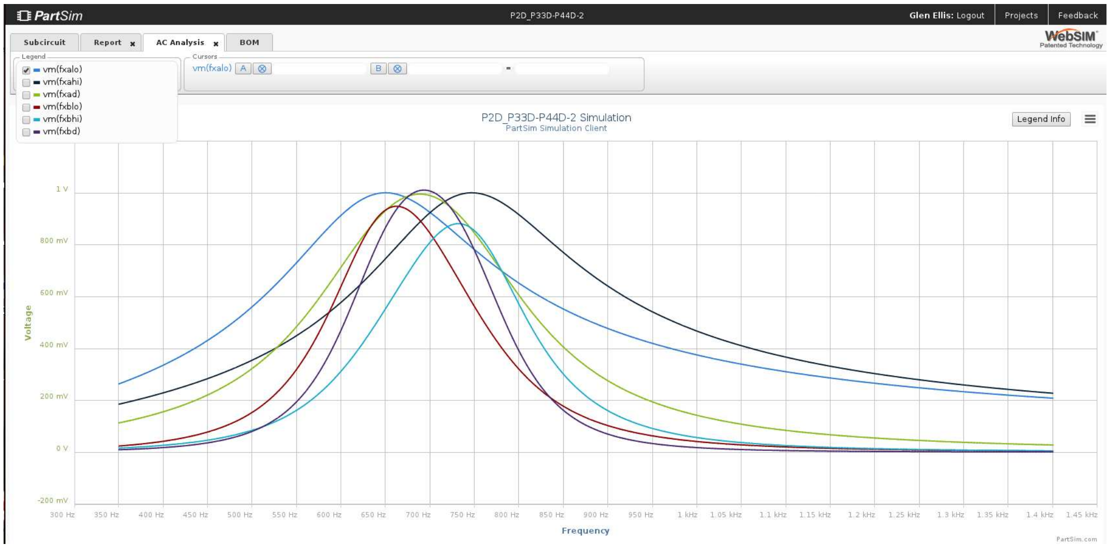
****

Circuit: P2D-P33D-P44D

Special Differentiated Stages to replace Filter stages.
Two Tuned Summing Stages
replaced by Two Un-Tuned Differentiation Stages.
Same Results !!!

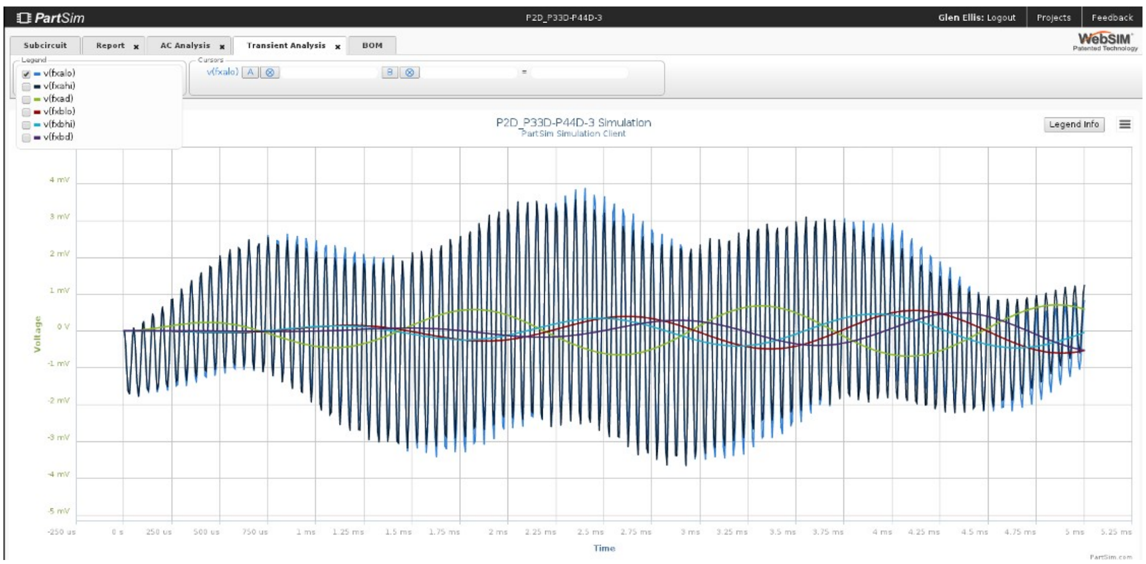


Bode Plot: P2D-P33D-P44D



Transient Plot: P2D-P33D-P44D

Analysis, Sine Input,
showing Phase-Shifting to obtain the required Band-Pass.



Intro: P2D-DIF-WN

P2D-P77D-P55D

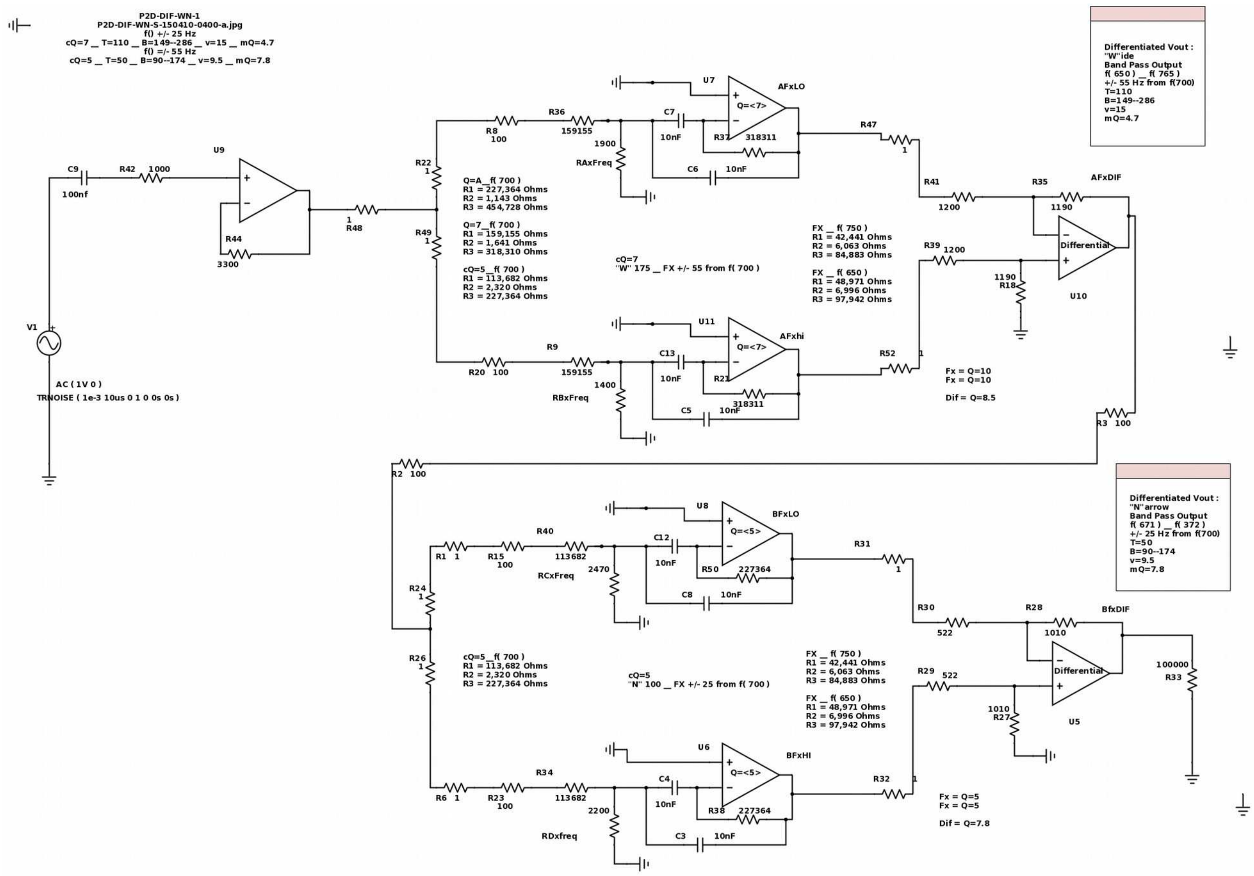
This design is- for extremely steep "N" sidebands.
Special Differentiated Stages to replace Filter stages.
Two Tuned Summing Stages
replaced by Two Un-Tuned Differentiation Stages.
Same Results !!!

First Triad is Q=7 +/- 50 Hz , then Differentiated.
Second Triad is Q=5 +/- 25 Hz , then Differentiated.

First Triad is "W"ide v=15 .
Pass-Band is extremely steep for a "W"ide Filter.

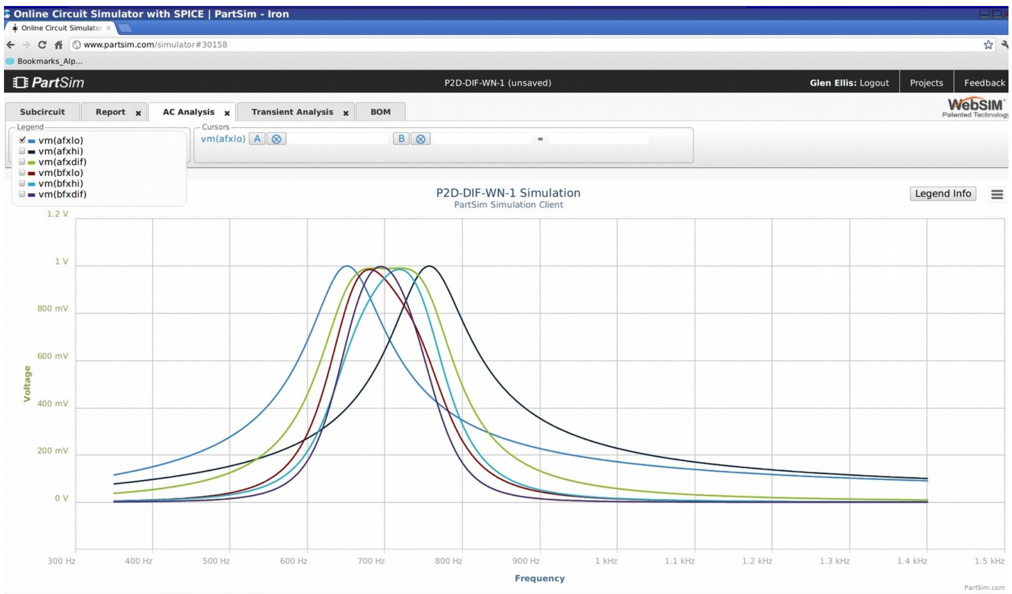
Second Triad is "N"arrow v=9.5 !!!
Pass-Band sidebands are Close to DSP
and already analog for Audio Output.
At +/-90 degrees from f(700) the signal is near -48dB down.

Circuit: P2D-DIF-WN



Bode Plot: P2D-DIF-WN

Differential Traces are : "W"ide GREEN . "N"arrow Black .
There are two passbands for "W" and two passbands for "N",
each passband is followed by a Differential Stage.



Transient Plot: P2D-DIF-WN

Signal injected was "Noise".
Shown is the effectiveness of a Differentiator
in eliminating Common Mode noise signal.

Conclusions: about the P2’C’ design approach :

The Parallel designs have been intriguing to develop.
These are really radical 'techy' circuits and good to brag about.
*** The 12 stage (P2S-QAA-P445) circuit produces a "N"arrow filter output that compares favorably with DSP (after run through a DAC for the earphone signal).**
but are very ticky to construct and very tricky to tune.

Compared to the P2’A’ and P2’B’ design approach :
*** The P2’C’ designs are much simpler,**
and produce passbands similar to DSP,
and are easy to tune,
*** The P2’A’ and P2’B’ designs are much simpler,**
and produce passbands similar to DSP,
but are difficult to tune.

*** The AFX-RSF-S4-Q7 version #8 Filter circuit could be improved by using the P2D-DIF filter section.**

AFX design , the thrust of this “AFX” project
with

(1) Roofing stage based on P2D triad,
(2) driving the log-limiter,
(3) driving the Quad Filter Stage ,
(4) followed by the "W" Integrated and "N" Differentiated Stages

can produce excellent results,
and is a well-developed good-working project.

AFX "W"ide and "N"arrow stages produce similar results,
and is much better for building and tuning.

.
That is the author's General Conclusion on this series of P2’C’ filters.
.

****

****

Chapter: AFX_mFilter_5_PFB

Resonant Filter Positive-Feed-Back

GC_ET_PFB.html

2021-01-06 11:31:45

Associate Professor **Dr.** **Josef Punčochář**
VŠB-Technical University of Ostrava, · Department of Electrical Engineering

__Original Design for Positive-FeedBack BandPass Filter. (GC_ET_PFB-rg.html)

GC_ET_PFB-rg.html

2018-01-10

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Based on circuit design by Dr. Josef Punchochar

Associate Professor

VŠB-Technical University of Ostrava, Ostrava · Department of Electrical Engineering

Copy from Josef Punchochar article :

This is a frequency dependent positive feedback - under-critical (a "bootstrap") if $k \cdot m = 1$ - only on the frequency ω_0 is on output FBP voltage U_1 - input divider therefore does not apply. The input divider is beginning "to work" for all other frequencies. **The circuit can operate with amplitudes of volts order - without degrading of performance.** Decisive is basically the size of the supply voltages, which defines the limitation of signal.

An example for $|k| = |m| = 1$ is in Fig.2. The R_b was realized by means of output resistance of the FBP in 1987.

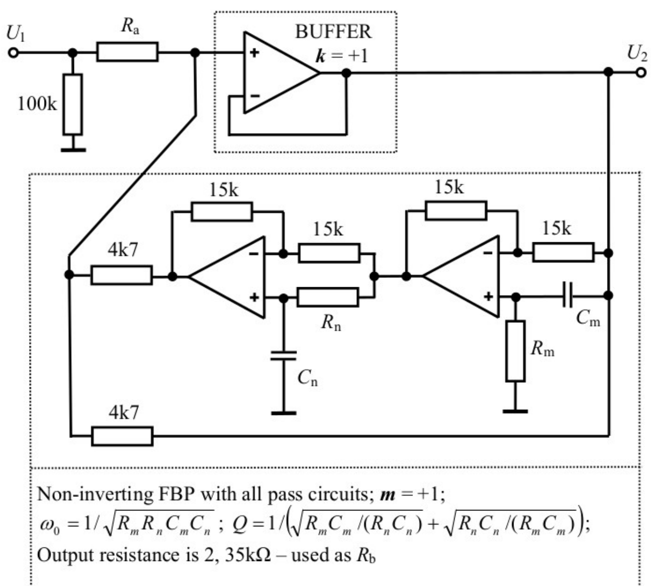
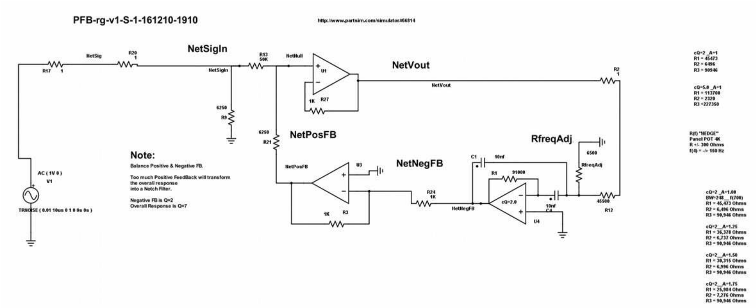


Fig.2. Realization by means of buffer and noninverting FBP; „3 x 741"; supply $U_{CC} = \pm 15$ V; $R_a = 122$k; $R_m = R_n = 1$k3; $C = 10$ nF: measured $f_0 = 11$ kHz; $Q_e = 27, 5$; for U_1less than 4 V (for larger amplitudes take effect slew rate)

Developed into this by Glen Ellis :
Example of circuit modification to handle Positive Boot-Strap Feedback via Multiple-Feedback Band Pass Filter.
Advantage is : Adjust f(0) via a single resistor R(freqAdj) +/- 300 Hz.

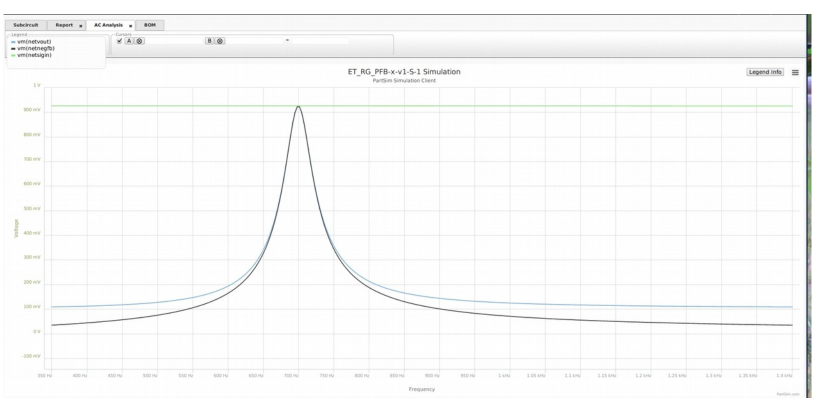


SPICE circuit, 161210, Glen Ellis.
Based on circuit design by Josef Punchochar, Research Gate Net
Example of circuit modification to handle Positive Boot-Strap Feedback via Multiple-Feedback Band Pass Filter.
Advantage : Adjust f(0) via a single resistor R(freqAdj) +/- 300 Hz.

Balance between Positive & Negative FB
Too much FeedBack will transform circuit into a Notch Filter.

V(out) is NetVout
f(0) = 700 Hz
FeedBack Q=2
Effecive Q=7
BW=100 Hz

Original NetSigIn (source signal) is flat (green).
FeedBack inverted (black) (generated at Q=2)
Overall Response is Q=7 Positive BandPass (blue).

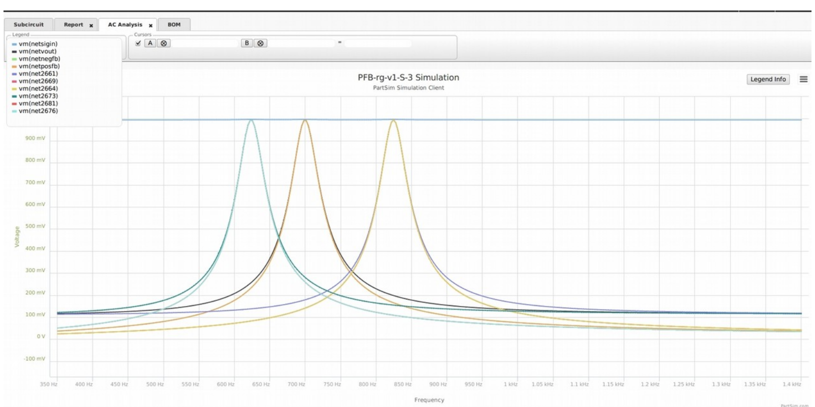


Transient Plot

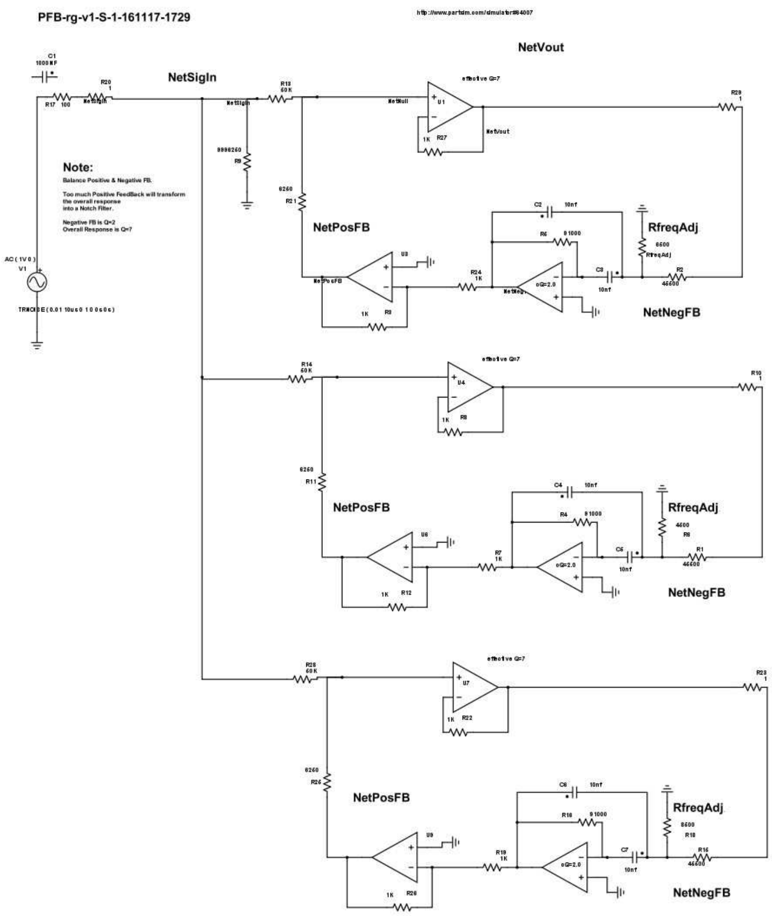
Adjust f(0) via a Single Resistor R(freqAdj) +/- 300 Hz.
Change f(0) via R6 .
Initially R(freq) is 6500 Ohm.   Adjust :   Up = lower f(0)   and   Down = higher f(0).

In f(0) change,
Gain will change as the minor ratio of R(in) / R(freq).
Q will change as squareroot of delta(f) change.
But BW will remain same.
(Author uses this method for adjusting f(0) change of +/- 300 Hz.)

*** Demonstrating shifting f(0) via R(freqAdj)



*** Demonstrating circuit to generate bode of shifting f(0) via R(freqAdj)


PFB-rg-v1-S-1-161117-1729
NetVout
NetSigIn
Note:
Balance Positive & Negative FB.
Too much Positive FeedBack will transform
the overall response
into a Notch Filter.
Negative FB is Q=2
Overall Response is Q=7
AC (1V 0)
V1
NetPosFB
NetNegFB
RfreqAdj
NetPosFB
NetNegFB
RfreqAdj
NetPosFB
NetNegFB
RfreqAdj

****

Further Reading on Positive Feed-Back developments :

AAA GC_ET_PFB-bpf.html

GC_ET_PFB-bpf.html
2018-01-10
11:05:01

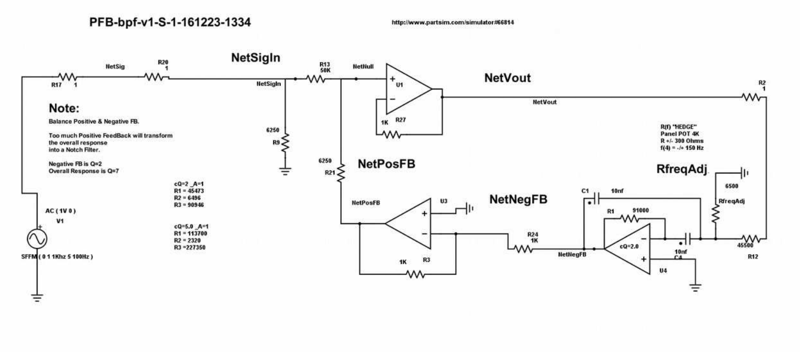
***** Based on circuit design by Dr. Josef Punchochar , Research Gate Net**

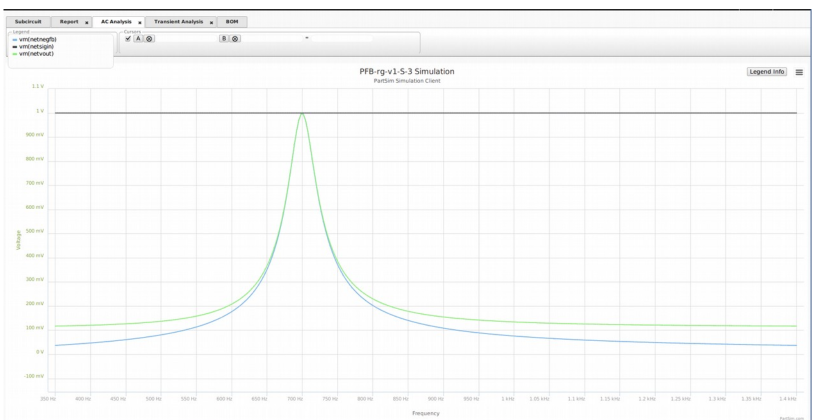
***** the Positive-FeedBack Band-Pass Filter, with single resistor f() control.**
Negative FeedBack is Q2 and PFB BandPass V(out) is Q7

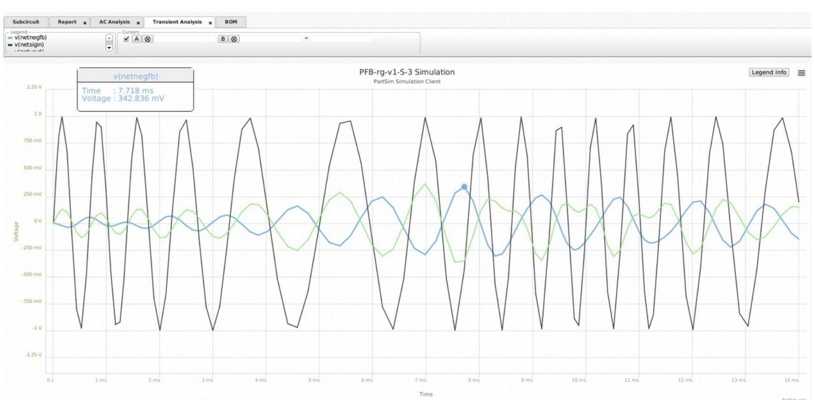
Example of circuit modification to handle Positive Boot-Strap Feedback via Multiple-Feedback Band Pass Filter.
Advantage is : Adjust f(0) via a single resistor R(freqAdj) +/- 500 Hz.

***** SPICE circuit, Glen Ellis.**
***** Example of circuit modification to handle Positive Boot-Strap Feedback via Multiple-Feedback Band Pass Filter.**
***** Advantage : Adjust f(0) via a single resistor R(freqAdj) +/- 300 Hz.**

***** Balance between Positive & Negative FB**
***** else will transform circuit into a Notch Filter or into an Oscillator.**

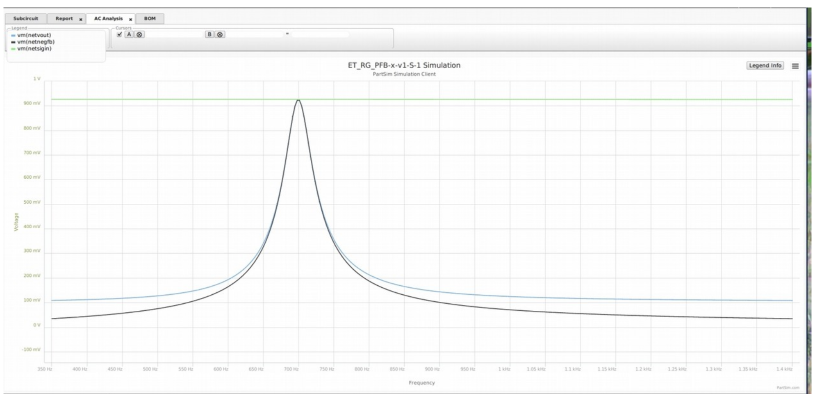

PFB-bpf-v1-S-1-161223-1334
http://www.partsim.com/simulator#66814
NetSigIn
NetVout
Note:
Balance Positive & Negative FB.
Too much Positive FeedBack will transform
the overall response
into a Notch Filter.
Negative FB is Q=2
Overall Response is Q=7
cQ=2 _A=1
R1 = 45473
R2 = 6496
R3 = 90946
cQ=5.0 _A=1
R1 = 113700
R2 = 2320
R3 =227350
R(f) "HEDGE"
Panel POT 4K
R +/- 300 Ohms
f(4) = -/+ 150 Hz
NetPosFB
RfreqAdj
NetNegFB
AC (1V 0)
V1
SFFM (0 1 1Khz 5 100Hz)


PFB-rg-v1-S-3 Simulation
PartSim Simulation Client
vm(netnegfb)
vm(netsigin)
vm(netvout)
Frequency


PFB-rg-v1-S-3 Simulation
PartSim Simulation Client
v(netnegfb)
Time : 7.718 ms
Voltage : 342.836 mV
Time

V(out) is NetVout
f(0) = 700 Hz
FeedBack Q=2
Effecive Q=7
BW=100 Hz

***** Original NetSigIn (source signal) is flat (green).**
***** FeedBack inverted (blue) (generated at Q=7)**
***** Overall Response is Q=7 Positive BandPass (black).**

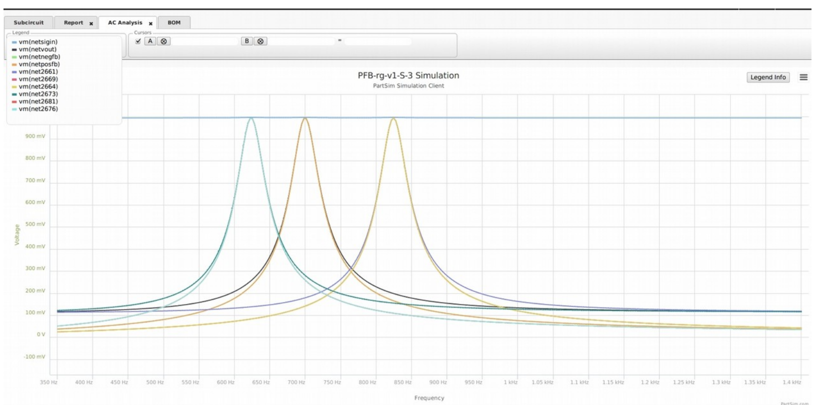


Transient Plot : Noise Input and Positive-FeedBack and f(700) filtered V(out) . Green Noise, Black Positive-FeedBack, Blue f(700) V(out) .

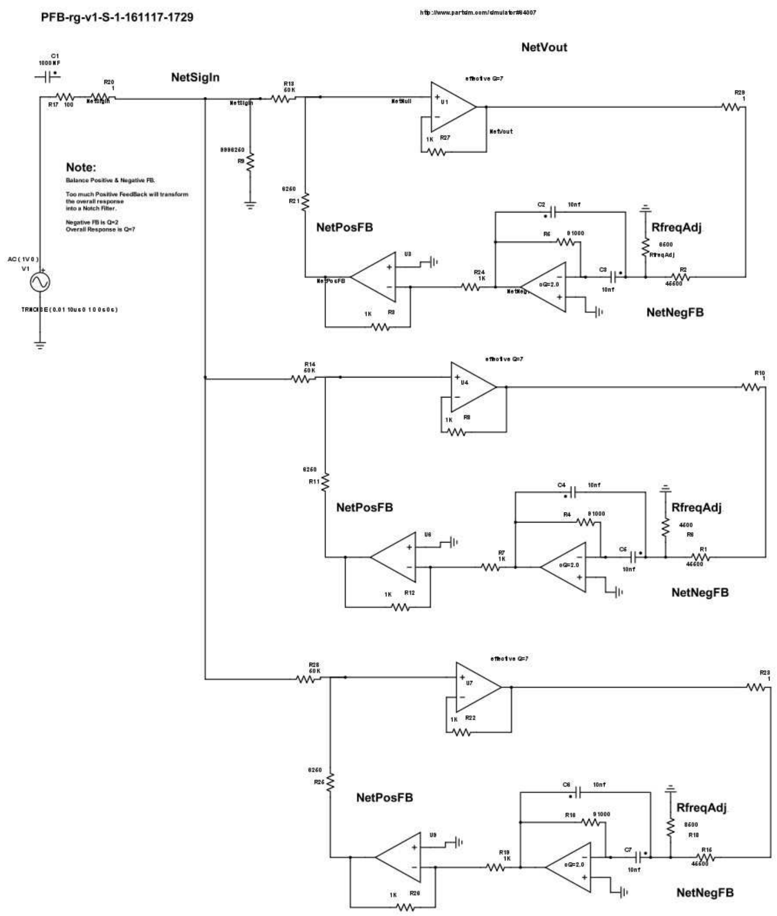
Adjust f(0) via a Single Resistor R(freqAdj) +/- 300 Hz.
Change f(0) via R6   [R(freq)].
Initially R(freq) is 6500 Ohm.   Adjust :   Up = lower f(0)   and   Down = higher f(0).

In f(0) change,
Gain will change as the minor ratio of R(in) / R(freq).
Q will change as squareroot of delta(f) change.
But BW will remain same.
(Author uses this method for adjusting f(0) change of +/- 300 Hz.)

*** Demonstrating shifting f(0) via R(freqAdj)



*** Demonstrating circuit to generate bode of shifting f(0) via R(freqAdj)


PFB-rg-v1-S-1-161117-1729
NetVout
NetSigIn
Note:
Balance Positive & Negative FB.
Too much Positive FeedBack will transform the overall response into a Notch Filter.
Negative FB is Q=2
Overall Response is Q=7
AC (1V 0)
V1
NetPosFB
RfreqAdj
NetNegFB
NetPosFB
RfreqAdj
NetNegFB
NetPosFB
RfreqAdj
NetNegFB

****

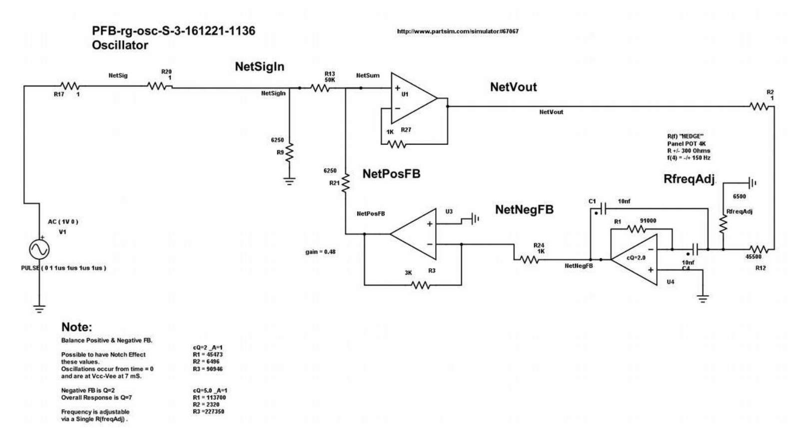
****

[BBB](#)   GC_ET_PFB-osc.html

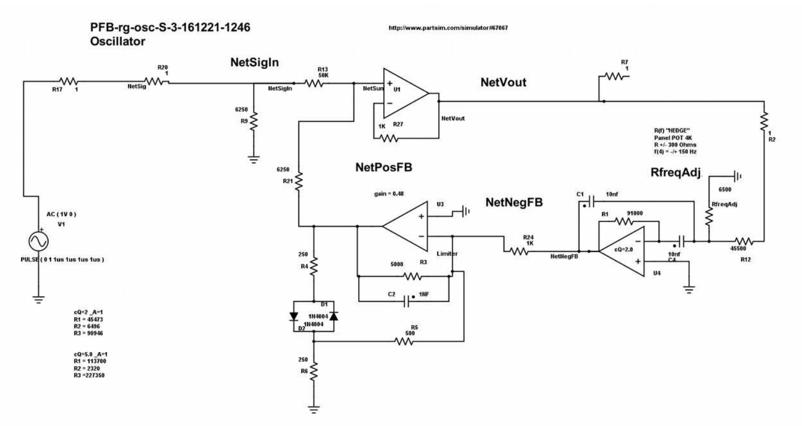
GC_ET_PFB-osc.html

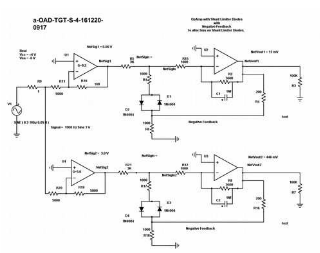
2018-03-08
19:06:07

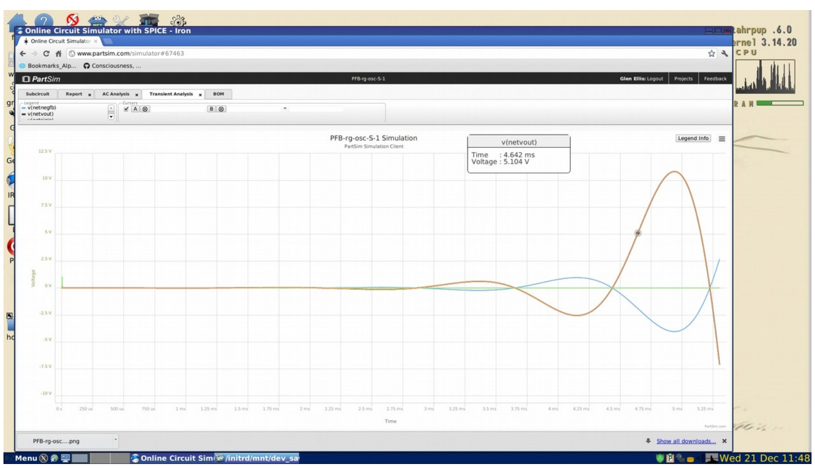
***** Our further development of the Positive Feed-Back Oscillator concept.
***** Positive Feed-Back with NO limiter control
***** produces a "SQUARE" V(out) , with single resistor f() control.

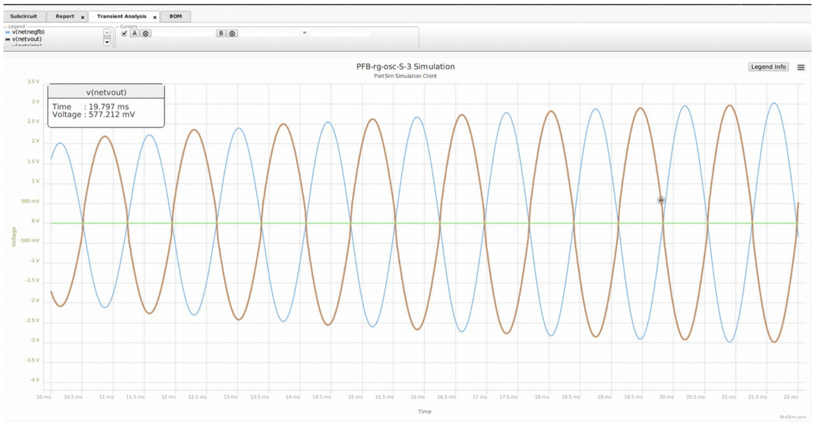


***** Positive Feed-Back with limiter control
***** produces a "SINE" V(out) , with single resistor f() control.


PFB-rg-osc-S-3-161221-1246
Oscillator
http://www.partsim.com/simulator#67067
NetSigIn
NetVout
NetPosFB
NetNegFB
RfreqAdj
gain = 0.48
AC (1V 0)
V1
PULSE (0 1 1us 1us 1us 1us)
Limiter
1N4004
cQ=2 _A=1
R1 = 45473
R2 = 6496
R3 = 90946
cQ=5.0 _A=1
R1 = 113700
R2 = 2320
R3 =227350


a-OAD-TGT-S-4-161220-0917


Online Circuit Simulator with SPICE - Iron
www.partsim.com/simulator#67463
PartSim
PFB-rg-osc-S-1
Transient Analysis
PFB-rg-osc-S-1 Simulation
v(netvout)
Time : 4.642 ms
Voltage : 5.104 V
v(netnegfb)
v(netvout)
Legend Info
Time
PFB-rg-osc....png
Show all downloads...
Online Circuit Sim
Wed 21 Dec 11:48



****

GC_ET_PFB.html

2021-01-06   11:31:45

Associate Professor   **Dr.**   **Josef Punčochář**
VŠB-Technical University of Ostrava,   · Department of Electrical Engineering

__Original Design for Positive-FeedBack BandPass Filter. (GC_ET_PFB-rg.html)

GC_ET_PFB-rg.html

2018-01-10

11:08:01

Based on circuit design by Dr. Josef Punchochar

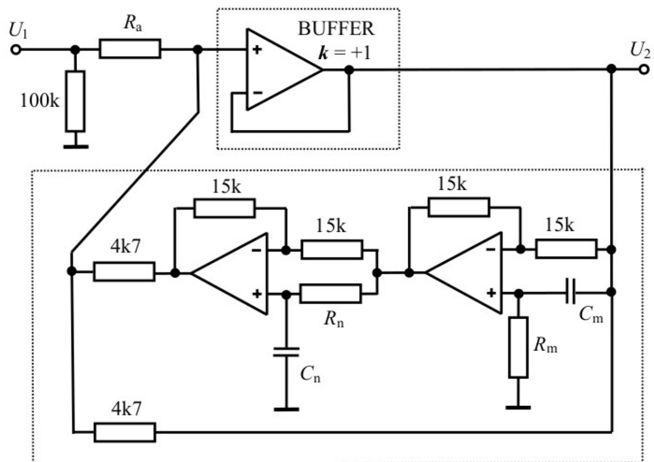
Associate Professor

VŠB-Technical University of Ostrava, Ostrava · Department of Electrical Engineering

Copy from Josef Punchochar article :

This is a frequency dependent positive feedback - under-critical (a "bootstrap") if $k \cdot m = 1$ - only on the frequency ω_0 is on output FBP voltage U_1 - input divider therefore does not apply. The input divider is beginning "to work" for all other frequencies. **The circuit can operate with amplitudes of volts order - without degrading of performance.** Decisive is basically the size of the supply voltages, which defines the limitation of signal.

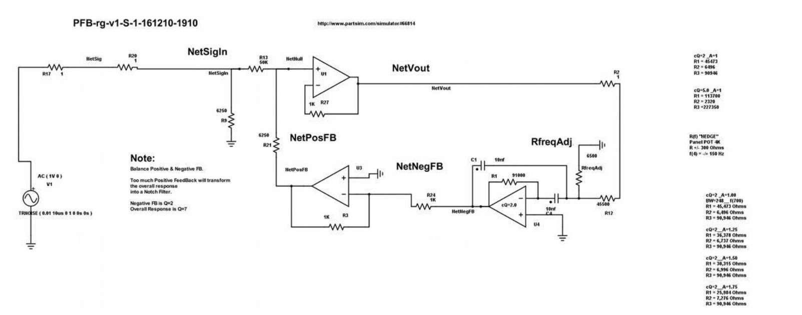
An example for $|k| = |m| = 1$ is in Fig.2. The R_b was realized by means of output resistance of the FBP in 1987.



Non-inverting FBP with all pass circuits; $\boldsymbol{m} = +1$;
$\omega_0 = 1/\sqrt{R_m R_n C_m C_n}$; $Q = 1/\left(\sqrt{R_m C_m /(R_n C_n)} + \sqrt{R_n C_n /(R_m C_m)}\right)$;
Output resistance is 2, 35kΩ – used as R_b

Fig.2. Realization by means of buffer and noninverting FBP; „3 x 741"; supply $U_{CC} = \pm 15$ V; $R_a = 122$k; $R_m = R_n = 1$k3; $C = 10$ nF: measured $f_0 = 11$ kHz; $Q_e = 27, 5$; for U_1less than 4 V (for larger amplitudes take effect slew rate)

Developed into this by Glen Ellis :
Example of circuit modification to handle Positive Boot-Strap Feedback via Multiple-Feedback Band Pass Filter.
Advantage is : Adjust f(0) via a single resistor R(freqAdj) +/- 300 Hz.

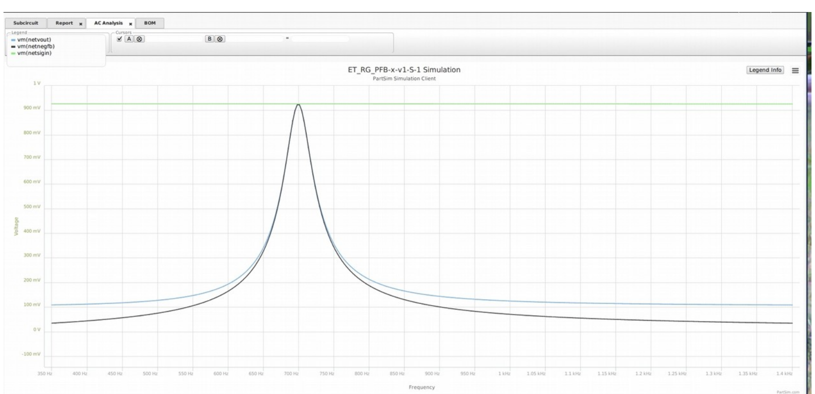


SPICE circuit, 161210, Glen Ellis.
Based on circuit design by Josef Punchochar, Research Gate Net
Example of circuit modification to handle Positive Boot-Strap Feedback via Multiple-Feedback Band Pass Filter.
Advantage : Adjust f(0) via a single resistor R(freqAdj) +/- 300 Hz.

Balance between Positive & Negative FB
Too much FeedBack will transform circuit into a Notch Filter.

V(out)   is   NetVout
f(0) = 700 Hz
FeedBack Q=2
Effecive Q=7
BW=100 Hz

Original NetSigIn (source signal) is flat (green).
FeedBack   inverted (black) (generated at Q=2)
Overall Response is Q=7 Positive BandPass (blue).

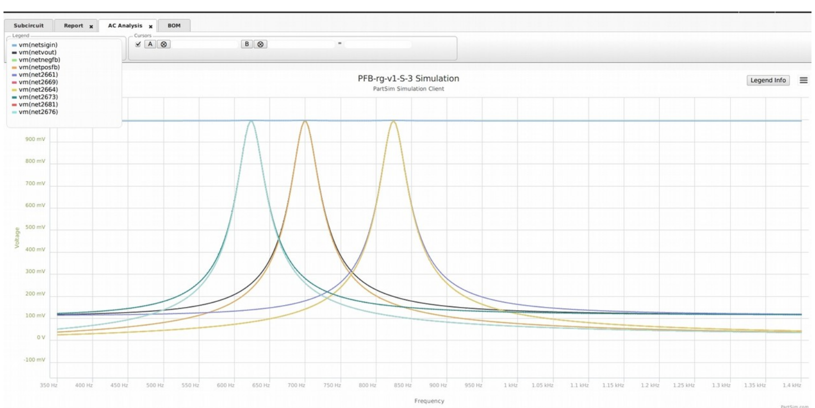


Transient Plot

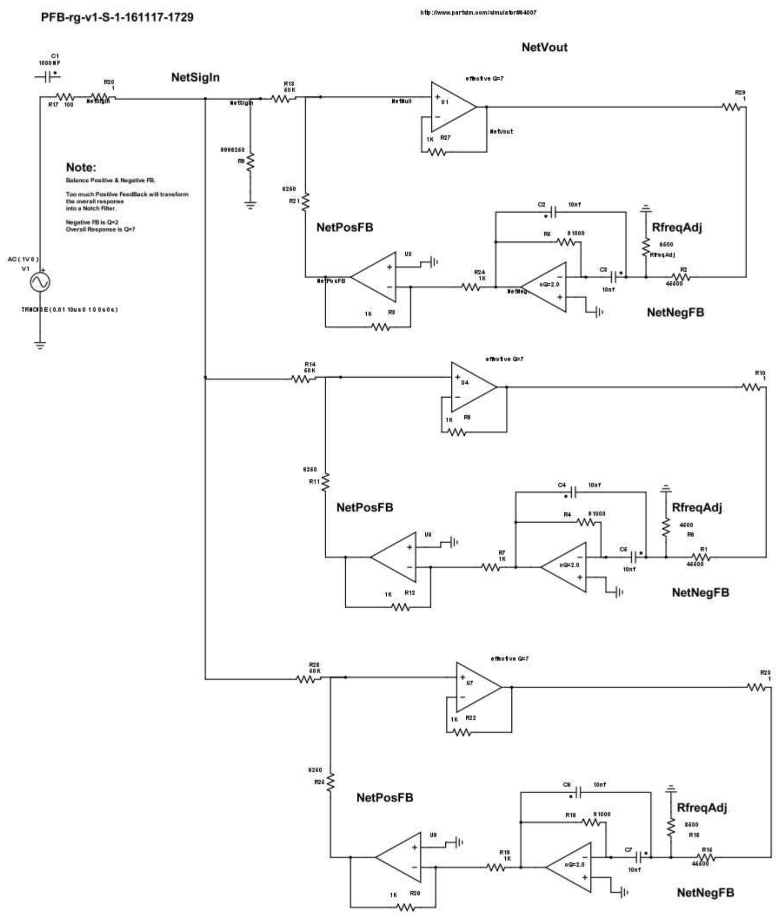
Adjust f(0) via a Single Resistor R(freqAdj) +/- 300 Hz.
Change f(0) via R6 .
Initially R(freq) is 6500 Ohm. Adjust : Up = lower f(0) and Down = higher f(0).

In f(0) change,
Gain will change as the minor ratio of R(in) / R(freq).
Q will change as squareroot of delta(f) change.
But BW will remain same.
(Author uses this method for adjusting f(0) change of +/- 300 Hz.)

*** Demonstrating shifting f(0) via R(freqAdj)



*** Demonstrating circuit to generate bode of shifting f(0) via R(freqAdj)


PFB-rg-v1-S-1-161117-1729
NetVout
NetSigIn
C1
1000NF
R20
1
R17 100
Note:
Balance Positive & Negative FB.
Too much Positive FeedBack will transform
the overall response
into a Notch Filter.
Negative FB is Q=2
Overall Response is Q=7
AC (1V 0)
V1
NetPosFB
RfreqAdj
NetNegFB
NetPosFB
RfreqAdj
NetNegFB
NetPosFB
RfreqAdj
NetNegFB

****
****

Circuit: Positive-Boot-Strapped Band-Pass

AAA GC_ET_PFB-bpf.html

GC_ET_PFB-bpf.html
2018-01-10
11:05:01

***** Based on circuit design by Dr. Josef Punchochar , Research Gate Net**

Positive Boot-Strap Feedback

****

Circuit: Positive-FeedBack Filter – by Dr. Punchochar

*** the Positive-FeedBack Band-Pass Filter,
with single resistor f() control.
Negative FeedBack is Q2 and PFB BandPass V(out) is Q7

This is a frequency dependent positive feedback - under-critical (a "bootstrap") if $k \cdot m = 1$ - only on the frequency ω_0 is on output FBP voltage U_1 - input divider therefore does not apply. The input divider is beginning "to work" for all other frequencies. **The circuit can operate with amplitudes of volts order - without degrading of performance.** Decisive is basically the size of the supply voltages, which defines the limitation of signal.

An example for $|k| = |m| = 1$ is in Fig.2. The R_b was realized by means of output resistance of the FBP in 1987.

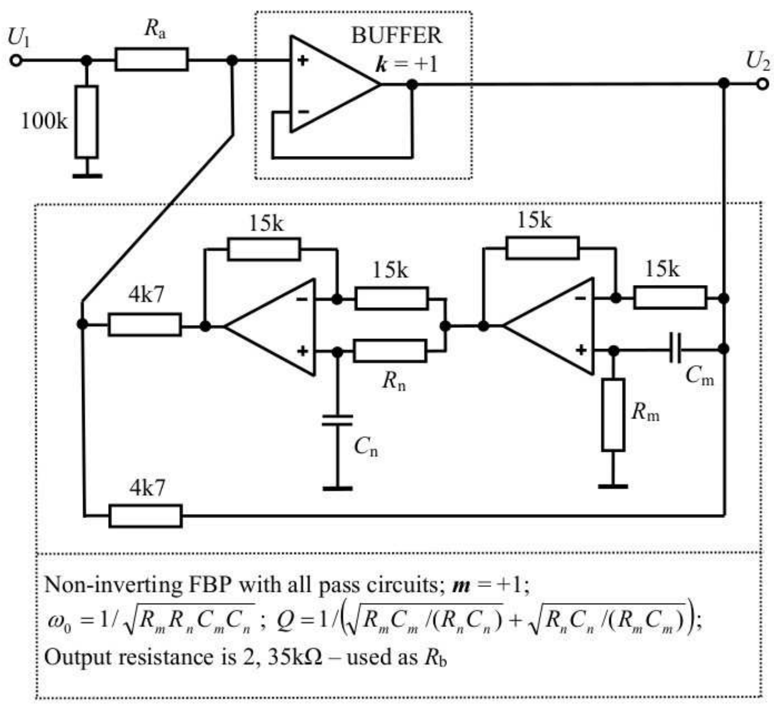


Fig.2. Realization by means of buffer and noninverting FBP; „3 x 741"; supply $U_{CC} = \pm 15$ V; $R_a = 122$k; $R_m = R_n = 1$k3; $C = 10$ nF: measured $f_0 = 11$ kHz; $Q_e = 27, 5$; for U_1 less than 4 V (for larger amplitudes take effect slew rate)

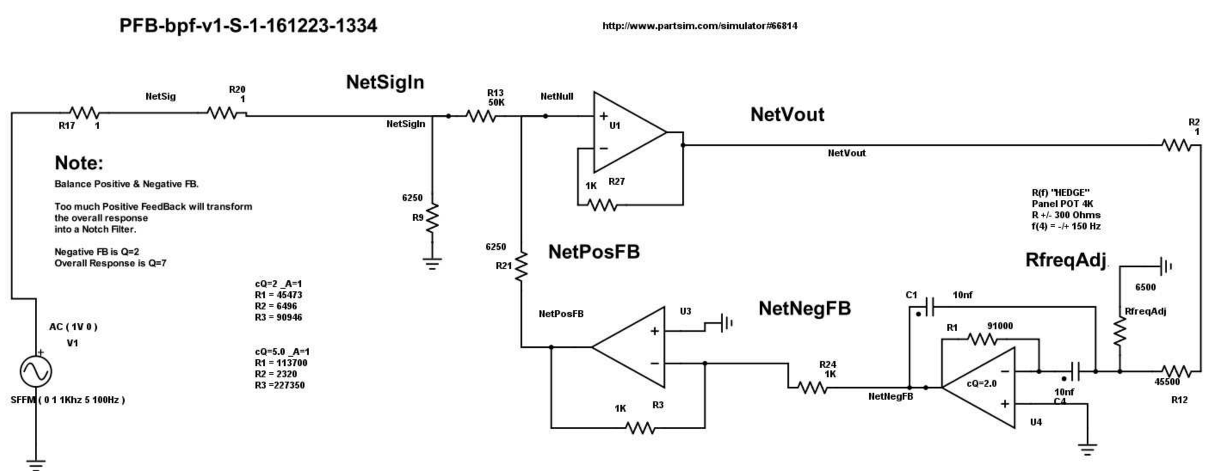
****

Circuit: **Positive-FeedBack-by Glen Ellis**

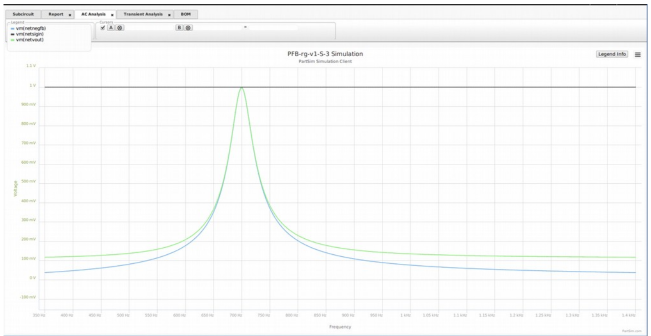
Example of circuit modification to handle Positive Boot-Strap Feedback
via Multiple-Feedback Band Pass Filter.
Advantage is : Adjust f(0) via a single resistor R(freqAdj) +/- 500 Hz.

Circuit: Positive Feed-Back Filter
***** SPICE circuit, Glen Ellis.**
***** Example of circuit modification to handle Positive Boot-Strap Feedback via Multiple-Feedback Band Pass Filter.**
***** Advantage : Adjust f(0) via a single resistor R(freqAdj) +/- 300 Hz.**

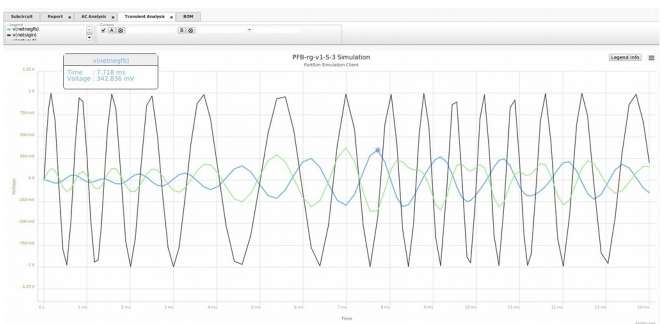
***** Balance between Positive & Negative FB**
***** else will transform circuit into a Notch Filter or into an Oscillator.**



Bode Plot: **Positive Feed-Back Filter**



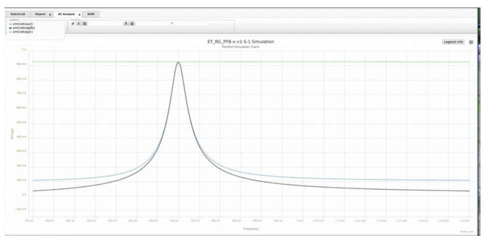
Transient Plot: **Positive Feed-Back Filter**



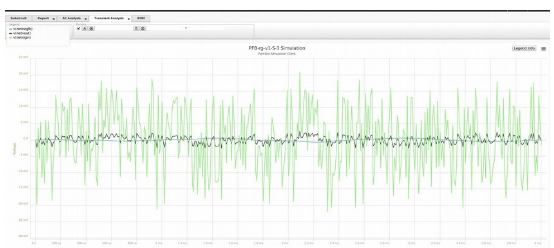
Plots: **Positive Feed-Back Filter**

V(out) is NetVout
f(0) = 700 Hz
FeedBack Q=2
Effecive Q=7
BW=100 Hz

***** Original NetSigIn (source signal) is flat (green).**
***** FeedBack inverted (blue) (generated at Q=7)**
***** Overall Response is Q=7 Positive BandPass (black).**



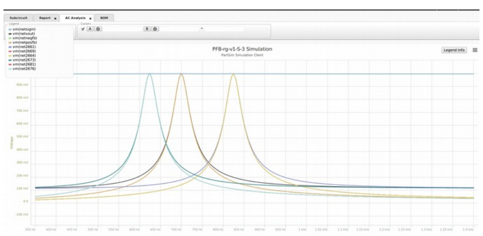
Transient Plot : Noise Input and Positive-FeedBack and f(700) filtered V(out) . Green Noise, Black Positive-FeedBack, Blue f(700) V(out) .



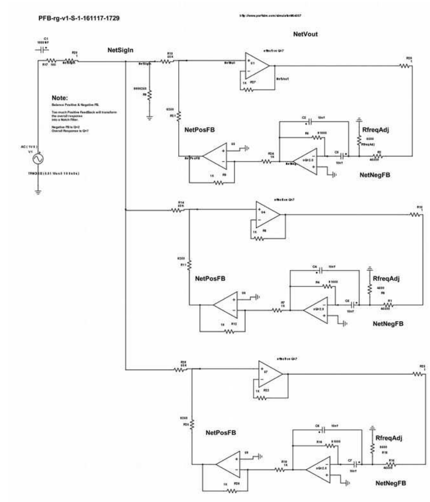
Adjust f(0) via a Single Resistor R(freqAdj) +/- 300 Hz.
Change f(0) via R6 [R(freq)].
Initially R(freq) is 6500 Ohm. Adjust : Up = lower f(0) and Down = higher f(0).

In f(0) change,
Gain will change as the minor ratio of R(in) / R(freq).
Q will change as squareroot of delta(f) change.
But BW will remain same.
(Author uses this method for adjusting f(0) change of +/- 300 Hz.)

*** Demonstrating shifting f(0) via R(freqAdj)



*** Demonstrating circuit to generate bode of shifting f(0) via R(freqAdj)

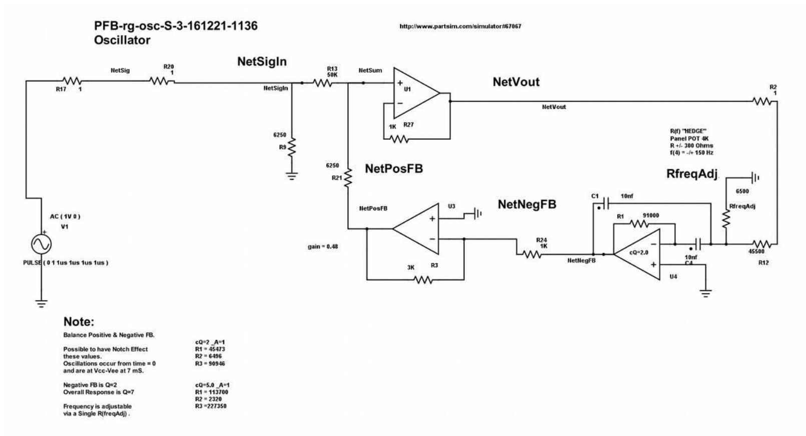


BBB GC_ET_PFB-osc.html

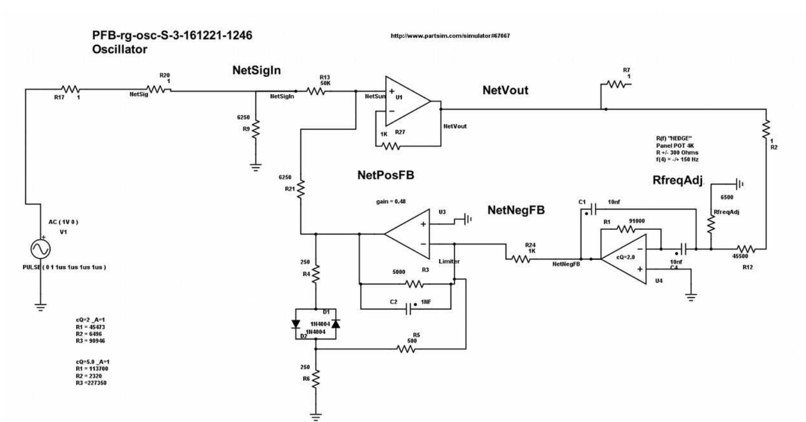
GC_ET_PFB-osc.html

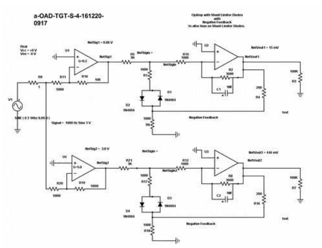
2018-03-08
19:06:07

***** Our further development of the Positive Feed-Back Oscillator concept.
***** Positive Feed-Back with NO limiter control
***** produces a "SQUARE" V(out) , with single resistor f() control.



***** Positive Feed-Back with limiter control
***** produces a "SINE" V(out) , with single resistor f() control.

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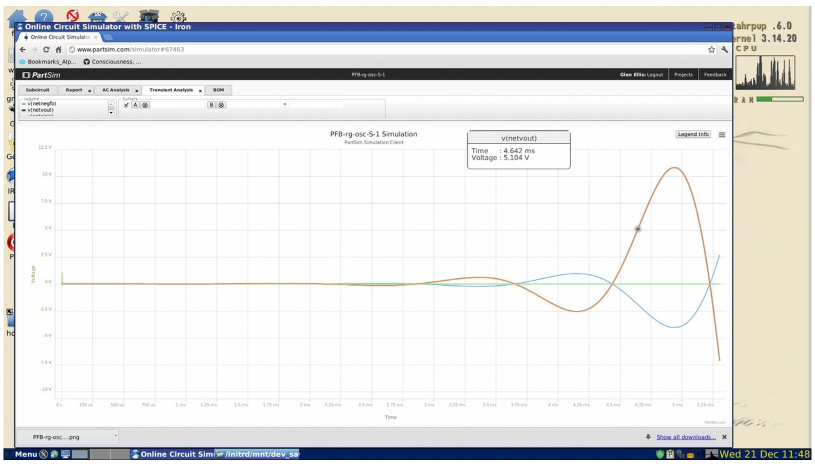
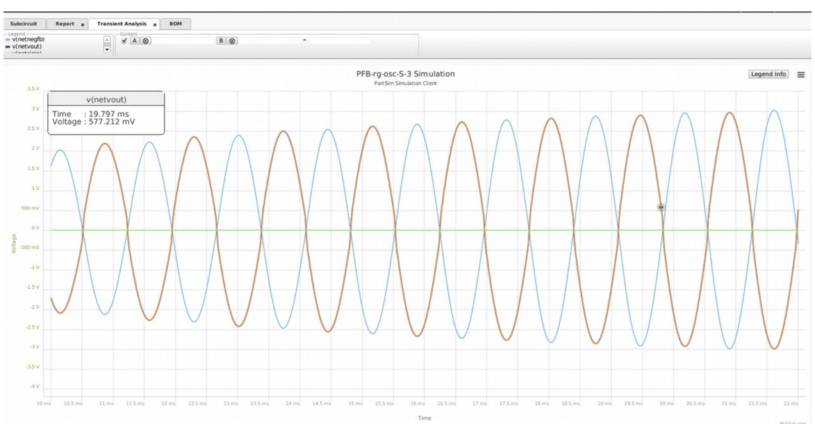

Online Circuit Simulator with SPICE - Iron
PFB-rg-osc-S-1 Simulation
PartSim Simulation Client
v(netvout)
Time : 4.642 ms
Voltage : 5.104 V
Legend Info
Time
Voltage
Wed 21 Dec 11:48


Subcircuit
Report
Transient Analysis
BOM
v(netnegfb)
v(netvout)
PFB-rg-osc-S-3 Simulation
PartSim Simulation Client
v(netvout)
Time : 19.797 ms
Voltage : 577.212 mV
Legend Info
Time
Voltage

**