



Optimizing Circuit Performance

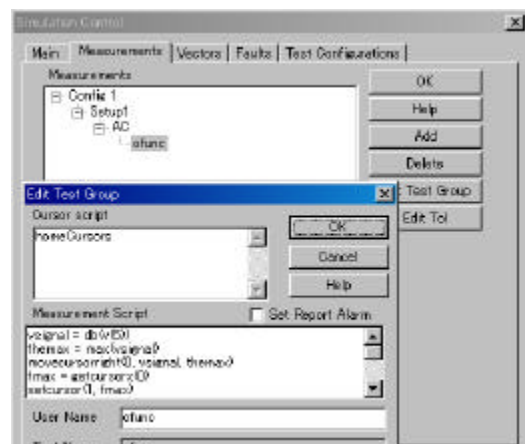
With ICAP/4's optimization feature, you can specify which parameters to change and by what percentage. When a simulation runs, the parameters are varied to try to minimize a design objective (function), which is a function (e.g., phase margin, bandwidth, etc.) that can be reduced to a scalar unit. Let's try an exercise with the goal of obtaining optimized values for all the active components with 30% tolerance so that the bandwidth is 22.45K.

- Open `..¥spice8¥Circuits¥Optimizer¥bwopt.dwg`.
 - Double click on L1 in the SpiceNet schematic to bring up its property dialog.
 - Select **Tolerance¥Sweep¥Optimizer** tab, and enter 30% for the value under the Optimize column.
 - Repeat the former steps for L2, L3, L4, C1, C2, C3 and C4.
- OR simply click Next Part button and enter the values.**
- Click on ICAPS icon
 - Select **Measurement** tab, and select **ofunc**.
 - Click on **Edit Test group** button.

You will see this script in the Edit Test Group window:
`homeCursors;`

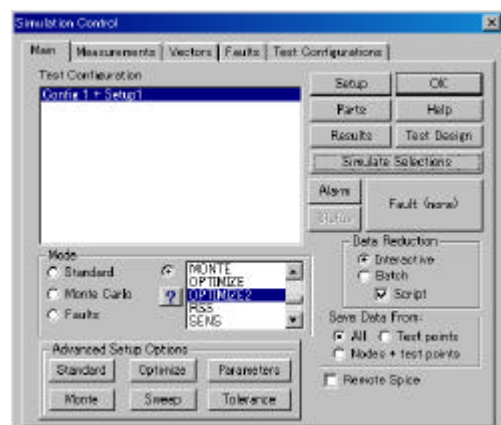
In the Measurement Script field:

```
vsignal = db(v(5))
themax = max(vsignal)
movecursorright(0, vsignal, themax)
fmax = getcursorx(0)
setcursor(1, fmax)
movecursorright(1, vsignal, themax-3)
movecursorleft(0, vsignal, themax-3)
bandwidth = getcursorx(1)-
getcursorx(0)
ofunc = bandwidth-22.45e3
ofunc = ofunc*ofunc
print ofunc
```



These scripts can be modified according to your needs. All measurements such as min, max, rms, pk_pk, etc. are Measured between the default cursors, cursor 0 and 1. The other cursors are for labeling and measuring delta values.

- Click the OK button to close the Edit Test Group dialog.
 - Select **Main** tab, and select **Test Configuration**
- “Config 1 and Setup1.” Select the Optimize2 simulation template mode and Interactive Data Reduction mode. Check script and Save Data From, All.**
- Click on the **Simulation Selections** button.



All the modified simulation parameters and parameter changes that give the bestval are shown in the Output dialog. The results also can be viewed in tabular form at the end of the .OUT file.

From Output dialog



From .Out file

```
##### optimized results #####

l1:inductance      750.099797U
c1:capacitance     22.9829807U
l2:inductance      75.2493580M
c2:capacitance     182.815714N
l3:inductance      850.395196U
c3:capacitance     18.8225708U
l4:inductance      116.541626M
c4:capacitance     136.000129N

ac analysis measurements

test 1 ofunc
ofunc = 3.224879e-001

Total run time: 12.716 seconds.
```

Recommended values

Optimized for 22.45K bandwidth using 30% tolerances	
l1:inductance	750.100000U
c1:capacitance	22.9913141U
l2:inductance	75.2500000M
c2:capacitance	182.815707N
l3:inductance	850.457452U
c3:capacitance	18.8218750U
l4:inductance	116.543750M
c4:capacitance	135.998884N

Compare the optimized values with the recommended values listed on the schematic, you will see these two results should be almost the same.