General FDCFOA Sallen-Key Filter Analysis – An Asymmetrical Case

Each model of FDCFA with resistor in gate and resistor in gate has a form

They are:

1. 13\_SimpModelControlledSources/Models\_CFMB\_OUT  
   13\_SimpModelControlledSources/Models\_NO\_CFMB\_OUT  
   14\_SimpModelControlledSourcesAsym/Models\_CFMB\_OUT  
   14\_SimpModelControlledSourcesAsym/Models\_NO\_CFMB\_OUT
2. 13\_SimpModelControlledSources/Models\_TE\_CFMB\_OUT  
   14\_SimpModelControlledSourcesAsym/Models\_TE\_CFMB\_OUT
3. 13\_SimpModelControlledSources/Models\_TE\_NO\_CFMB\_OUT  
   14\_SimpModelControlledSourcesAsym/Models\_TE\_NO\_CFMB\_OUT
4. 15.SimpModelControlledSourcesImprovedkR/Models\_CFMB\_OUT  
   16.SimpModelControlledSourcesImprovedkRAsym/Models\_CFMB\_OUT
5. 15.SimpModelControlledSourcesImprovedkR/Models\_NO\_CFMB\_OUT  
   16.SimpModelControlledSourcesImprovedkRAsym/Models\_NO\_CFMB\_OUT
6. 15.SimpModelControlledSourcesImprovedkR/Models\_TE\_CFMB\_OUT  
   16.SimpModelControlledSourcesImprovedkRAsym/Models\_TE\_CFMB\_OUT
7. 15.SimpModelControlledSourcesImprovedkR/Models\_TE\_NO\_CFMB\_OUT  
   16.SimpModelControlledSourcesImprovedkRAsym/Models\_TE\_NO\_CFMB\_OUT

Instead of determining the final transfer function, which can be difficult for the further post-processing, we can disperse each HOSC to 3 adding additional deletions.

In such a case we should determine:

Then:

Developed values are:

It becomes obvious that the only thing we have to do obtain the common gain to be equal 0 is to satisfy: , for any version of FDCFO and it does not depend on any tracking errors in the active device. The long denominator presented below is not necessary to obtain for concluding it.

The above form is much clearer than when we insert the FDCFOA at once.

The surrounding circuit around the active device causes that . Thus:

1. 13\_SimpModelControlledSources/Models\_CFMB\_OUT  
   13\_SimpModelControlledSources/Models\_NO\_CFMB\_OUT  
   14\_SimpModelControlledSourcesAsym/Models\_CFMB\_OUT  
   14\_SimpModelControlledSourcesAsym/Models\_NO\_CFMB\_OUT
2. 13\_SimpModelControlledSources/Models\_TE\_CFMB\_OUT  
   14\_SimpModelControlledSourcesAsym/Models\_TE\_CFMB\_OUT
3. 13\_SimpModelControlledSources/Models\_TE\_NO\_CFMB\_OUT  
   14\_SimpModelControlledSourcesAsym/Models\_TE\_NO\_CFMB\_OUT
4. 15.SimpModelControlledSourcesImprovedkR/Models\_CFMB\_OUT  
   16.SimpModelControlledSourcesImprovedkRAsym/Models\_CFMB\_OUT
5. 15.SimpModelControlledSourcesImprovedkR/Models\_NO\_CFMB\_OUT  
   16.SimpModelControlledSourcesImprovedkRAsym/Models\_NO\_CFMB\_OUT
6. 15.SimpModelControlledSourcesImprovedkR/Models\_TE\_CFMB\_OUT  
   16.SimpModelControlledSourcesImprovedkRAsym/Models\_TE\_CFMB\_OUT
7. 15.SimpModelControlledSourcesImprovedkR/Models\_TE\_NO\_CFMB\_OUT  
   16.SimpModelControlledSourcesImprovedkRAsym/Models\_TE\_NO\_CFMB\_OUT