

Re: anyone familiar with this topology?

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From: Kevin Aylward (*salesEXTRACT_at_anasoft.co.uk*)

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Winfield Hill wrote:

> *Kevin Aylward wrote...*

>>

>> *Tony Williams wrote:*

>>> *justin <justin.c@se.net> wrote:*

>>>>

>>>> <http://www.armory.com/~rstevew/Public/Ccts/4oma120w.gif>

>>>>

>>>> *I'm sure I have seen this concept before, I think in one of those TI or NS data books but built around 741, yes the μ A741, this was in the early '80!*

>>>>

>>>> *I originally saw it as a reader's idea in Electronics, about the late 70's to early 80's. "Getting Power and Gain out of the 741-type op amp." By Pedro P. Garza, Jr. GE Co, Apollo and Ground Systems, Houston, Texas.*

>>>>

>>>> *I later pinched the idea and pushed it to a 1250VA amplifier (8+8 Mosfets in the o/p stage, fan cooled), used in a test jig to stimulate wound components at full power.*

>>>>

>>>> *Winfield Hill also tried out the idea last year, with a high voltage power amplifier. I don't know what the final outcome was.*

>

> *It worked out very well, Tony. Remember the schematic I sent you?*

>

>> *Personally, I think this type of method is a truly dreadful way to design an amp. There are so many issues with it. The output devices bias is completely undefined, unless it set to essentially zero.*

>

> *With the crummy circuit in the gif, perhaps, but not with a sensible circuit. In fact it's remarkably easy to define the class A current. And control the crossovers, because one is using current-source mode to drive the output, with drive circuitry pegged to the rails, rather than an awkward floating bias circuit.*

>

>> *The transfer function is not well controlled or modelled, in addition to poor hf response.*

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>

> *It has a well behaved transfer function,*

Oh? care to present the *full* effect of all the opamp poles?

>*although the load figures in.*

> *Which in the end may limit bandwidth, but allows good output linearity*

> *and is especially well suited for current drive amplifiers.*

>

> *In the case of Mark Alexander's current-feedback design (Analog*

> *Devices AN-211), a much wider bandwidth was achieved than with common*

> *circuits.*

This has little to do with using the op-amp. In fact, its in spite of the op-amp. As I already explained in <http://www.anasoft.co.uk/EE/currentfeedbackmyth/currentfeedbackmyth.html>, the fundamental reason for the speed of a current mode amp is due to the class AB input stage.

The basic issue is that an op-amp has *lots* of poles, as it has many stages. Minimising the number of stages is usually the best thing to do. A discrete design might easily have, say 4 less poles. So, in *general* I don't recommend using an op-amp in a discrete power amp. You can usually make a much better optimised design because an op-amp is designed with general compromises to make it a general purpose part. In a discrete design, you can ignore many opamp characteristics, and optimise the circuit better. For example, when you do a full custom analogue design, you essentially never use a redesigned available catalogue part internally. There are simply not optimum for more specific requirements.

>

>> *Its really grungy, like finger nails down a blackboard sort of thing.*

>> *Those that use this type of circuit should be shot on sight, and have*

>> *their entrails thrown to the vultures.*

>

> *Why don't you tell us how you really feel?*

>

>> *In general, putting an op amp in the feedback loop is bad news. It*

>> *justs gets you extra poles that you could avoid with a discrete*

>> *design.*

>

> *Actually, not here,*

Oh?

> *because with the opamp acts as a voltage-current*

> *converter, via the opamp power-rail cascode transistors.*

Of course, to first order.

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- > *The current*
- > *transfer function is determined by resistor ratios: the high-voltage*
- > *rail resistor, the opamp's output load resistor (and capacitor!), and*
- > *the Darlington output-transistor's emitter-degeneration resistor.*

Now do a full, detailed analysis than includes the op-amp exactly.

Kevin Aylward

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