

FOLDED-CASCODE AMPLIFIER WITH VARIABLE SLEW-RATE CIRCUIT

BY

MANUELA MOCANU and ARCADIE CRACAN

Abstract. A slew-rate enhancement circuit incorporated into a CMOS folded-cascode operational transconductance amplifier is proposed, which does not affect the small signal response of the core amplifier. It employs a dynamic current boosting technique which turns on a floating current source whenever the input crosses a prescribed voltage level. The input voltage level for which the slew-rate enhancement circuit becomes active is set to be equal to one overdrive voltage, V_{OV} , by proper transistor sizing. The slew-rate enhancement circuit functions a limited period as long as the input differential voltage is equal to the overdrive voltage.

As a result, an extra current is injected in the folding node of the transconductance amplifier. This will lead to the increase of the transconductance's current. The extra current injected in the operational transconductance amplifier's (OTA) folding nodes can be modified through the use of a differential amplifier. By modifying this current, the transconductance's slew-rate changes.

The main problem of this new slew-rate enhancement circuit is due to the fact that by modifying the extra current injected into the folding nodes, V_{OV} changes which implies that the SRE circuit would become active for different values of the inputs voltage difference.

Key words: slew-rate enhancement circuit; folded-cascode amplifier; variable floating current source; large signal.