

Correction

Correction to “A Low-Offset Low-Noise Sigma-Delta Modulator With Pseudorandom Chopper-Stabilization Technique”

Hsin-Liang Chen, Po-Sheng Chen, and Jen-Shiun Chiang

In the paper [1], a transfer function was derived with some errata in the final result. The new derivation has been done in the next section with the charge conservation theorem.

Transfer Function of Offset Voltage in the Parasitic Insensitive Integrator: As shown in Fig. 1(a), a parasitic insensitive integrator is operated with $\Phi_{1(d)}$ and $\Phi_{2(d)}$ which are sampling and evaluating modes, respectively.

Assume operational amplifier obtains infinite gain, in the sampling mode, Fig. 1(b), we have:

$$\sum Q(\Phi_1) = V_i[n-1]C_S + (V_O[n-1] - V_{OS})C_I. \quad (1)$$

On the other hand, in the evaluating mode, Fig. 1(c), we have:

$$\sum Q(\Phi_2) = -V_{OS}C_S + (V_O[n] - V_{OS})C_I. \quad (2)$$

According to the charge conservation theorem, the charge at the negative input of the operational amplifier should be conservative with the following equilibrium:

$$-\sum Q(\Phi_1) = -\sum Q(\Phi_2). \quad (3)$$

Therefore,

$$(1 - z^{-1})V_O = \frac{C_S}{C_I}z^{-1} + \frac{C_S}{C_I}V_{OS}$$

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The authors are with the Department of Electrical Engineering, Tamkang University, Tamsui, Taipei, Taiwan 251 (e-mail: hlchen@ee.tku.edu.tw).

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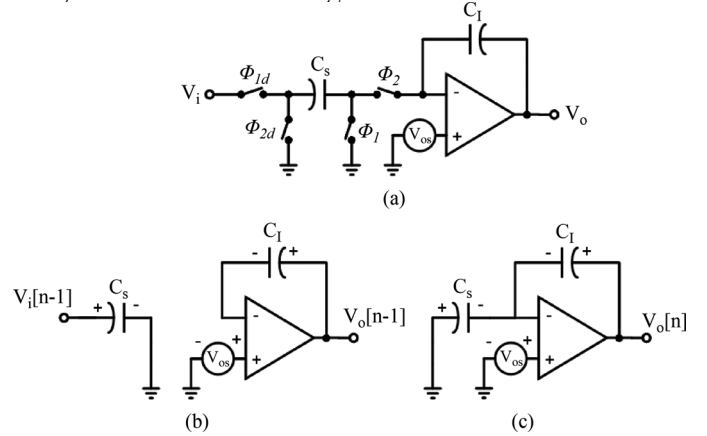


Fig. 1. (a) Parasitic insensitive integrator with offset voltage, V_{OS} , in (b) sampling mode and (c) evaluating mode.

$$\Rightarrow V_O = \frac{C_S}{C_I} \frac{z^{-1}}{1 - z^{-1}} V_I + \frac{C_S}{C_I} \frac{1}{1 - z^{-1}} V_{OS}. \quad (4)$$

By the charge conservation theorem, the concise derivation has been addressed. Since only the magnitude of the integrated offset voltage is different from the prior work, the conclusion of the original paper should still be preserved.

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REFERENCES

- [1] H. L. Chen, P. S. Chen, and J. S. Chiang, “A low-offset low-noise sigma-delta modulator with pseudorandom chopper-stabilization technique,” *IEEE Trans. Circuits Syst.*, vol. 56, no. 12, pp. 2533–2543, Dec. 2009.