Comments and Corrections

Corrections to "Normalization and Correction Factors for Magnetic Tunnel Junction Sensor Performances Comparison"

E. Monteblanco, A. Solignac, C. Chopin, J. Moulin, P. Belliot, N. Belin, P. Campiglio, C. Fermon, and M. Pannetier-Lecoeur

In the above article [1], unfortunately, errors were present in Table I, for the correction factors of the 1/4 Wheatstone bridge regarding the thermal noise, the shot noise, and the Hooge parameter entry. The errors have no influence on the experimental results, neither on the other table nor on the discussion and conclusions of the article. Table I contained an improper formula for the corrections factor (CF) in the case of the 1/4 Wheatstone bridge configuration (case c).

The correct table (Table I), shown on the next page, exhibits the correct values.

Changes are in the correction factor (CF) for the thermal noise

$$2\left(\frac{M-1}{M}\right)$$

instead of

$$2\left(\frac{\mathrm{M}+(\mathrm{M}-1)^2}{\mathrm{M}^2}\right)$$

and for the Hooge parameter

$$\left(\frac{M-1}{M}\right)^2$$

instead of

$$\left(\frac{\mathrm{M}}{\mathrm{M}-1}\right)^2.$$

We also replaced the white noise entry to shot noise only (to separate the noise sources) and its corresponding expression; therefore, the line

$$\text{White noise} \quad S_{V,white} = 2qIR^2 \coth\left(\frac{qV_{TMR}}{2k_BT}\right)$$

is replaced by

$$\text{Shot noise} \quad S_{V,\text{shot}} = 2qI.$$

Note that the correction factor is unchanged, but corresponds to shot noise only (and not white noise).

References

[1] E. Monteblanco *et al.*, "Normalization and correction factors for magnetic tunnel junction sensor performances comparison," *IEEE Sensors J.*, vol. 21, no. 14, pp. 15993–15998, Jul. 2021.

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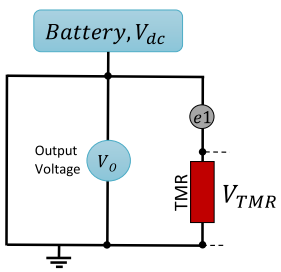
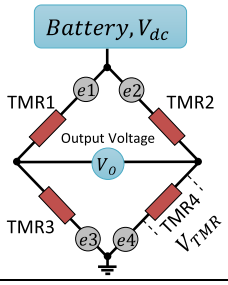
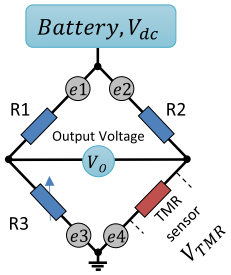
TABLE I
ELECTRONIC CIRCUITS MODELLED, NOISE EQUATIONS AND CORRECTION FACTORS

		(a)	(b)	(c)
Electronic circuit				
Equations		Correction factor (CF)		
Thermal noise	$S_{V,\mathrm{th}} = 4k_B TR$	1	1	$2\left(\frac{M-1}{M}\right)$
Shot noise	$S_{V,\mathrm{shot}} = 2qI$	1	1	$\left(\frac{M-1}{M}\right)^2$
1/f noise	$S_{V,1/f} = \frac{\alpha V_{TMR}^2}{NAf}$	1	1	$\left(\frac{M-1}{M}\right)^2$
Hooge parameter	$\alpha = \frac{S_{V,1/f}.NA.f}{V_{TMR}^2}$	1	1	$\left(\frac{M-1}{M}\right)^2$

T corresponds to the temperature, f is the frequency, k_B to the Boltzmann constant, R is TMR sensor resistance, I the applied current, q the electron charge, N is the number of pillars, A is the pillar surface, V_{TMR} corresponds to the TMR sensor applied bias voltage and $M = \frac{R1+R3}{R3} = \frac{R2+R4}{R4}$. The presence of RTN would lead to an additional term in the total noise, on which the CF should be applied.