Erratum to "Performance of APD-Based, PPM Free-Space Optical Communication Systems in Atmospheric Turbulence"

Mohammed R. Abaza and Kamran Kiasaleh, *Senior Member, IEEE*

In [1], the probability of error was computed for APD receivers. Due to an unintentional error, the square-root was omitted from the expression for the error rates in Eqs. (13) and (20) of ref. [1]. Hence, the correct expressions for the error rate are as follows:

$$P_b \approx \frac{1}{\sqrt{\pi}} \sum_{i=-N;i\neq 0}^{N} w_i Q\left(\sqrt{\frac{e^{2\left(\sqrt{2}\sigma_k x_i + m_k\right)}}{F e^{\sqrt{2}\sigma_k x_i + m_k} + K_n}}\right) \quad (13)$$

$$P_b^M \leq \frac{M}{2\sqrt{\pi}} \sum_{i=-N;i\neq 0}^{N} w_i Q\left(\sqrt{\frac{e^{2\left(\sqrt{2}\sigma_k x_i + m_k\right)}}{F e^{\sqrt{2}\sigma_k x_i + m_k} + K_n}}\right). \quad (20)$$

Subsequently, numerical results depicted in Figs. 1-4 of the paper must be corrected. The corrected figures are shown on this page and the following page. Finally, the last line in page 1459 to the third line in page 1460 of ref. [1], which states that "140 photons when σ_{sc}^2 =0.2 will require an average signal level of approximately 260 when σ_{sc}^2 =0.2 increases to 0.45. This is an increase of 2.6 dB in the required average signal level at the receiver," must be changed to "140 photons when σ_{sc}^2 =0.2 will require an average signal level of approximately 220 when σ_{sc}^2 =0.2 increases to 0.5. This is an increase of 1.96 dB in the required average signal level at the receiver."

References

[1] K. Kiasaleh, "Performance of APD-based, PPM free-space optical communication systems in atmospheric turbulence," *IEEE Trans. Commun.*, vol. 53, pp. 1455-1461, Sep. 2005.

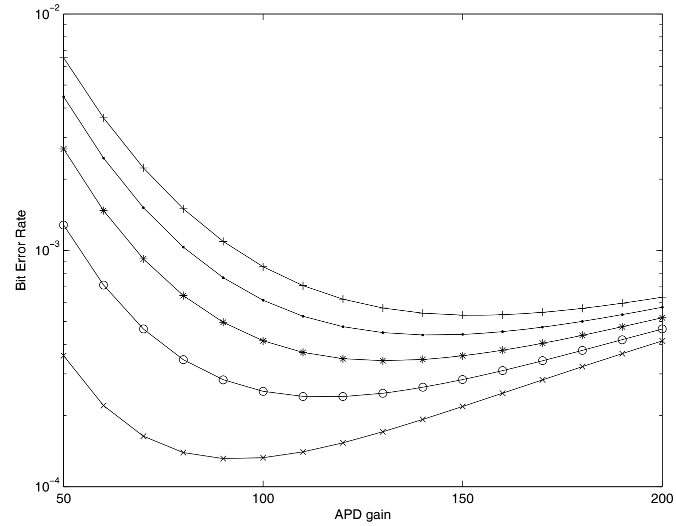

Fig. 1. Bit error rate as a function of $\bar{g}$ for thermal noise level T_0=100 K (x), 200 K (o), 300 K (*), 400 K (.), 500 K (+). $K_b = 10$, $\zeta = 0.028$, bit rate=2.4 Gbps, $\sigma_{sc}^2 = 0.25$, and $E\{K_s\} = 200$. (log-normal channel).

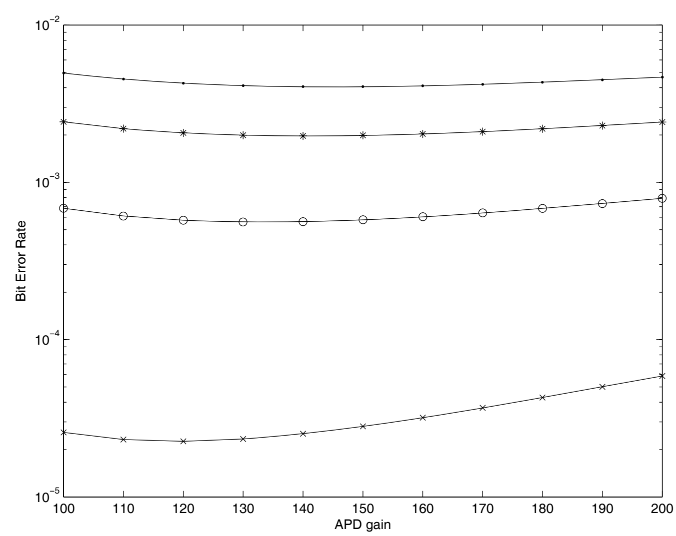

Fig. 2. Bit error rate as a function of $\bar{g}$ for σ_{sc}^2=0.1 (x), 0.3 (o), 0.5 (*), 0.7 (.). $K_b = 10$, $T_0 = 300$ K, $\zeta = 0.028$, bit rate=2.4 Gbps, and $E\{K_s\} = 200$. (log-normal channel).

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M. R. Abaza is with the Electronics and Communications Department, College of Engineering and Technology, Arab Academy for Science, Technology and Maritime Transport, Cairo, Egypt (e-mail: rauf_abaza@hotmail.com).

K. Kiasaleh is with The University of Texas at Dallas, Erik Jonsson School of Engineering and Computer Science, 2601 N. Floyd Rd., EC33, Richardson, TX 75083-0688 (e-mail: kamran@utdallas.edu).

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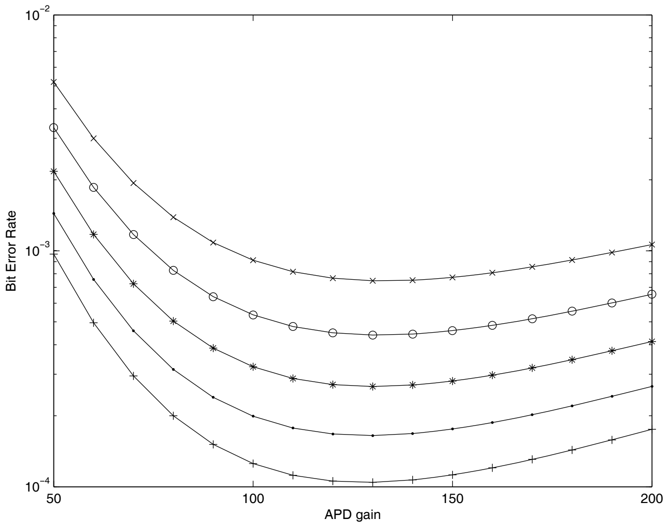

Fig. 3. Bit error rate as a function of $\bar{g}$ for $E\{K_s\}$=170 (x), 190 (o), 210 (*), 230 (.), and 250 (+). $K_b = 10$, $T_0 = 300$ K, $\zeta = 0.028$, bit rate=2.4 Gbps, and $\sigma_{sc}^2 = 0.25$. (log-normal channel).

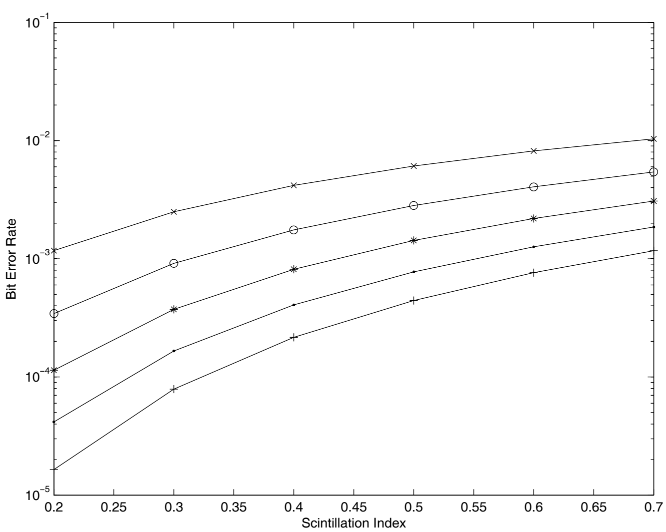

Fig. 4. Bit error rate as a function of σ_{sc}^2 for $E\{K_s\}$=140 (x), 180 (o), 220 (*), 260 (.), and 300 (+). $K_b = 10$, $T_0 = 300$ K, $\zeta = 0.028$, bit rate=2.4 Gbps, and $\bar{g} = 150$ (log-normal channel).