# Correction to "Adaptive Reduced Multivariate Polynomial Equalizers for Blu-ray Disc Channels"

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**Abstract** — *In this communication, we wish to point out and correct three errors made in our earlier paper [1] as follows: (1) co-authorship, (2) reporting the reference of prior work, and (3) simulation results*[1].

## I. Co-authorship

The first error is regarding the co-authorship of paper [1]. Since Dr. Kar-Ann Toh was unaware of the paper prior to its publication, he does not wish to be included as co-author of the paper [1]. We thereby withdraw his co-authorship from paper [1] so that he does not hold any responsibility regarding paper [1] and this correction note.

## II. Reference of a Prior Work

The second error is on referencing of a prior work. The reduced multivariate (RM) model originally proposed in [2] was applied as the equalization method to compensate for the full response of the Blu-ray Disc (BD) channels in [1]. We would like to highlight this adoption of a prior work and include the missing reference [2] in both [1] and current correction note.

## III. Simulation Results

The third error is related to the simulation results. The proposed detector shows the better bit error rate (BER) performances than the conventional partial response maximum likelihood (PRML) detectors in optical recording systems irrespective of the channel responses. For the maximum likelihood sequence detection (MLSD) in optical recording systems such as the BD system, a PRML detector has been in general employed [3], [4]. Therefore the proposed detector consists of a RM equalizer targeted for a PR system and the Viterbi detector for ML detection as shown in Fig. 1. The RM equalizer should not use the full response of the channel for the detection in the BD system. The simulation results in [1] had showed an equalization of the full response of the channel in the BD system and this error should be corrected.

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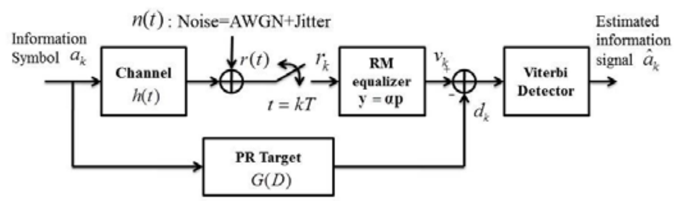


**Fig. 1. Proposed detector model**

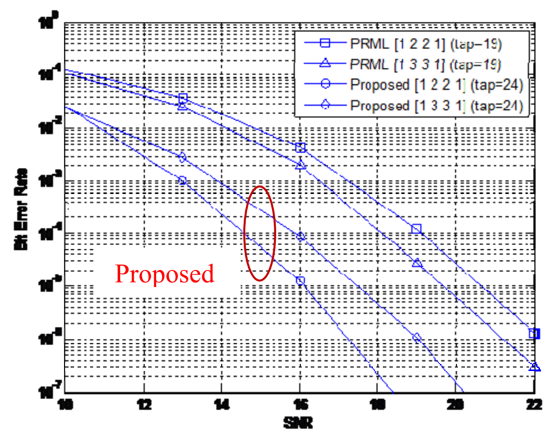


**Fig. 2. BER curves of the proposed and conventional PRML detectors when $S$ = 3.8 and the jitter ratio is 40%.**

Consider the BD channel with $S$ =3.8 which is the optical recording density as in [3], [4]. User data sequence is encoded by a (1, 7) run length limited (RLL) code [5]. The numbers of taps of the linear PR equalizer for the conventional PRML detector and the nonlinear PR equalizer for the proposed detector are 19 and 24, respectively. These are the sufficient numbers of taps for each equalizer.

Fig. 2 shows the BER curves for each PRML detector when $S$ = 3.8 and when the jitter ratio is 40%. The proposed detector has different BER performances depending on the targeted PR system. The proposed detector using [1 2 2 1] PR target has the best BER performance. When we use [1 2 2 1] PR target, the proposed detectors have more than 4dB gain compared with the conventional PRML detectors, and the performance gap is getting larger as the signal-to-noise ratio (SNR) increases.

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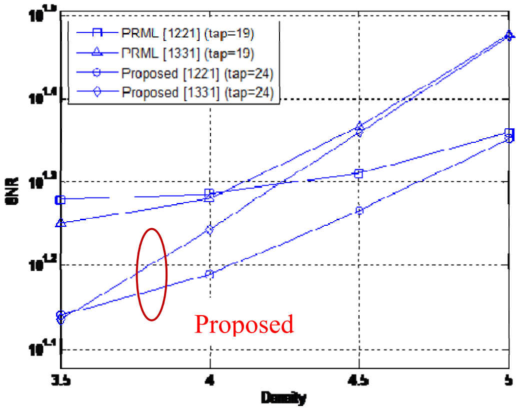


**Fig. 3. Required SNRs to obtain BER=$10^{-4}$ for the proposed and conventional PRML detectors when *S* is 3.5 to 5.0 and the jitter ratio is 40%.**

Fig. 3 shows the required SNRs to obtain BER=$10^{-4}$ for the proposed and conventional PRML detectors when *S* is 3.5 to 5.0 and when the jitter ratio is 40%. The proposed detectors show better BER performances than the conventional PRML detectors at low density region while the BER performance gap between the conventional PRML and proposed detectors is smaller as the recording density goes higher.

## IV. Conclusion

In this paper, we reported three errors regarding co-authorship, referencing of a prior work, and some simulation results. We apologize for these errors and the resulted confusion if any.

## References

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**[5]** M. Cohn, G. Jacoby, and A. Bates III, "Data Encoding Method and System Employing Two-Thirds Rate Code with Full Word Look-Ahead," U.S. Patent 4,337,458, 1982.

## BIOGRAPHIES

**Sooyong Choi** (S'98-M'04) was born in Seoul, Korea, in 1971. He received B.S.E.E, M.S.E.E. and Ph.D. degrees from Yonsei University, Seoul, Korea, in 1995, 1997, and 2001, respectively. During 2001, he worked as a Post-Doc. Researcher at the IT Research Group, YONSEI University. His work focused on proposing and planning for the 4th generation communication system. From February 2002 to August 2004, he had been a postdoctoral fellow at University of California, San Diego. From September 2004 to July 2005, he had been a researcher and research assistant professor at Oklahoma State University. Since September 2005, he has been an assistant professor in the School of Electrical and Electronic Engineering at Yonsei University. His primary research area is on adaptive signal processing techniques for digital communication and storage systems, interference cancellation techniques (equalization and detection) and MIMO detection techniques for wireless communication and modem techniques for future wireless communication systems.

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