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## A novel reverse hysteretic delta sigma modulator

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In this paper, a high speed reverse hysteretic delta-sigma modulator (R-HDSM) has been introduced. The proposed system operates with only non-negative signals that make all-optical high-speed implementation possible. Based on the input signal bounds and switching time, the proposed modulator parameters will be structured and characterized for the high-speed A/D conversion. The R-HDSM structural design has three characteristics appropriate for the high-speed A/D conversion. All input signals contained by the modulator are positive, no sample-and-hold switch and has almost a linear relationship with the time-averaged output. As shown on MATLAB/Simulink simulation results, relationship between the theoretical switching time and the proposed technique experimental results has been achieved successfully. Compared to the binary delta sigma modulator (BDSM), the switching time required for the proposed reverse HDSM modulator is much less. This can be explained based on the operation of the BDSM that involves switching of the bi-stable device. Since, switching time is reduced by more than 36%; experiment can be aimed at ultra-high speed A/D. Moreover the signals in the modulator are non-negative making the optical implementation possible.

### Biography

Raed Althomali is currently the Head of Electronics and Instrumentation Engineering Technology Department at Yanbu Industrial College, Saudi Arabia. He has earned his PhD in Electrical and Computer Engineering in Fiber Optics and Photonics, USA in 2014. His main areas of research interest are signal processing, all-optical devices, active filters and neural networks. He is a Member of the Saudi Council of Engineers and Optical Society of America.

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