

Study of Complex Multi-Bandpass DWA algorithm for I-Q Signal Generation

Masahiro Murakami^{1)*}, Shaiful Nizam Mohyar¹⁾, Haruo Kobayashi¹⁾,
 Tatsuji Matsuura¹⁾, Osamu Kobayashi²⁾, Masanobu Tsuji²⁾, Sadayoshi Umeda²⁾,
 Ryoji Shiota²⁾, Noriaki Dobashi²⁾, Masafumi Watanabe²⁾, Isao Shimizu¹⁾,
 Kiichi Niitsu³⁾, Nobukazu Takai¹⁾, Takahiro J. Yamaguchi¹⁾

¹⁾Gunma University, ²⁾Semiconductor Technology Academic Research Center, ³⁾Nagoya University
 *t13801479@gunma-u.ac.jp

The DAC circuits in transmitter parts (which often generate I-Q signals) of communication devices become more complicated and challenging^{1,2,3}. On the other hand, their testing cost increases due to the circuit complexity and high specification requirements. Their testing requires high quality I-Q signals at low cost⁴.

This paper discusses applicability of a complex bandpass (BP) $\Delta\Sigma$ DA modulator to generate I-Q signals with digital rich configuration. Also we newly derive complex multi-BP Data-Weighted-Averaging (DWA) algorithms for complex multi-tone signal generation.

Fig.1 shows complex multi-bandpass $\Delta\Sigma$ DA modulator and implementation of proposed complex Multi-BP DWA algorithm. Fig.2 shows our Matlab simulation results with and without the proposed DWA algorithm, and we see that our DWA algorithm is effective.

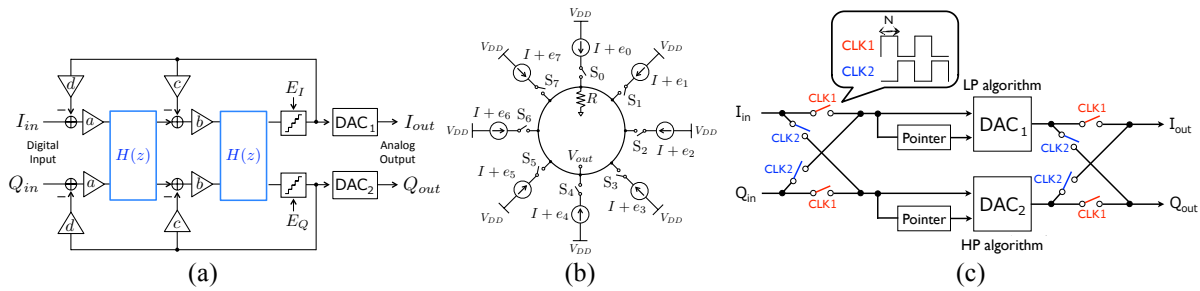


Fig.1 (a) 2nd-order complex multi-bandpass $\Delta\Sigma$ DA modulator.
 (b) 8-unit segmented current steering DAC in ring arrangement.
 (c) Implementation of proposed complex Multi-BP DWA algorithm.

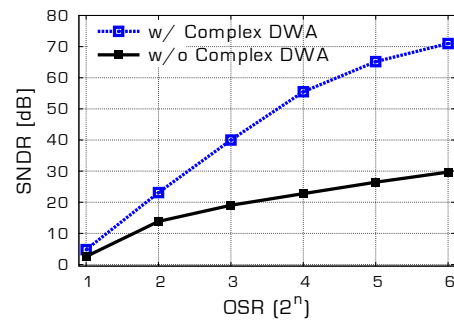
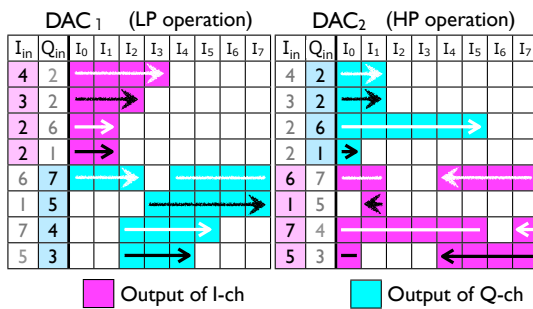


Fig.2 (a) Proposed complex multi-BP DWA algorithm (N = 4).
 (b) Simulation results with and without DWA.

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