Duality of I/Q Imbalance in RF Mixer: Application to the L_1-norm Based Estimation and Generalization to the SVD Based Model

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Abstract— **This paper addresses the duality between the gain/phase mismatch in the I/Q imbalance model of RF transceiver IC. The newly proposed L_1-norm based estimator exploiting this duality can serve as a sound alternative to the existing L_2-norm based estimator significantly lowering the implementation cost. Generalization of this duality empowers the single skew matrix representation of the I/Q imbalance model, mappable to an always existing unique SVD based model, to extend its compensation range limited too conservative so far with much higher level of confidence than ever before.**

Keyword— **I/Q imbalance, duality, L1-norm, cross correlation, singular value decomposition**

Ealwan Lee received B.S., M.S. and Ph. D all in electrical engineering from Seoul National University in 1992, 1994 and 1998, respectively. After graduation, he joined Daewoo Electronics and designed ATSC receiver through 2000. Since 2001, He has been with GCT Semiconductor, Inc. He has over 20-year expertise in VLSI implementation of wireless communication systems especially in WiMAX, WiFi and Bluetooth.