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Paper ID: 1570943472

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Paper Title: Improvement of Electrical Bio Impedance Measurement: Mixed Signal Approach

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## Abstract

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This article deploys a 5-level shorten rectangular wave technique to measure lock-in electrical bio-impedance (EBI) in medical diagnosis. The new shortened rectangular EBI signal has better properties in eliminating odd harmonics compared to the conventional 3-level shorten rectangular wave technique. The results show that the measurement errors in the 3-component EBI are reduced about 0.3% for R,  $jX$ , Z and 3% for Phase ( $\Phi$ ) when the 5-level signal is used instead 3-level signal.

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