7. Conclusion

Accurate frequency estimation is of great importance in industrial power systems. In this paper, the analytical expression of accuracy of frequency estimated by the non even item interpolation FFT based on built in self testing has been presented with March C algorithm. The interpolation polynomial of the frequency estimation is introduced in the case 64 -point FFT is adopted. From the analytical expression of accuracy of frequency estimation, the variances of frequency estimation are determined by choosing suitable values of length of FFT, sampling frequency, and ADC resolution using SAR. The accuracy of the derived expressions is verified by means of Modelsim simulations and experimental results, where the simulation and theoretic results show very good agreements with noise level changing and frequency variation.

References

[1] J.-Y. Ryu, B. C. Kim, and I. Sylla, "A new low-cost RF built-in selftest measurement for system-on-chip transceivers," IEEE Trans. Instrum. Meas., vol. 55, no. 2, pp. 381–388, Apr. 2006.
[2] N. Ahsan, J. Dabrowski, and A. Ouacha, "A self-tuning technique for optimization of dual band LNA," in Proc. Eur. Conf. Wirel. Technol., Oct. 2008, pp. 178–181.
[3] P. Carbone, E. Nunzi, and D. Petri, "Windows for ADC dynamic testing via frequency-domain analysis," IEEE Trans. Instrum. Meas., vol. 50, no. 6, pp. 1571– 1576, Dec. 2001.
[4] J. J. Blair, "Selecting test frequencies for sinewave tests of ADCs," in Proc. IEEE Instrum. Meas. Technol. Conf., May 2002, pp. 189–193.
[5] J. Duan and D. Chen, "ADC spectral performance measurement uncertainty in DFT method," in Proc. IEEE Electro/Inf. Technol., May 2011, pp. 1–4.
[6] IEEE Standard for Terminology and Test Methods for Analog to Digital Converters, IEEE Standard 1241–2010, Jan. 2011.
[7] D. Han, B. S. Kim, and A. Chatterjee, "DSP-driven self-tuning of RF circuits for process-induced performance Variability," IEEE Trans. Very Large Scale Integr. (VLSI) Syst., vol. 18, no. 2, pp. 305–314, Feb. 2010.
[8] Jose A.P, Jenkins K.A, and Reynolds S.K (2005), "On-chip spectrum analyzer for analog built-in self test," in Proc. IEEE VLSI Test Symp., pp. 131–136.
[9] Han D, Kim B.S, and Chatterjee A (2010), "DSP-driven self-tuning of RF circuits for process-induced performance Variability," IEEE Trans. Very Large Scale Integr. (VLSI) Syst., vol. 18, no. 2, pp. 305–314.

Author Profile

L. Maheswari received the B.E degree in ECE from Madha Engineering College, affiliated to Anna University, Kundrathur, Chennai-69 and pursuing M.E degree in Applied Electronics from Sri Muthukumaran institute of technology, chikkarayapuram, chennai-69.

Mr. B. V. P. Prasad is working as an Assistant Professor in Electronics and communication engineering at Sri Muthukumarn institute of technology, Chikkarayapuram, Chennai-69. .M.E in VLSI Design from Veltech Multitech college of Engineering, Avadi, Chennai and B.E in ECE from Seethai Ammal Engineering college, Sivagangai. He has more than 4 years teaching experience and 3 years in industry side. He is the member of ISTE (LM91473), published 1 International paper, 4 National and Organized two conferences, one seminar, one workshop and one STTPs.