A 1 mW Low Phase-Noise Relaxation Oscillator

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Abstract: We present a new RC relaxation oscillator with pulse self-biasing, to reduce power consumption, and with harmonic filtering and resistor feedback, to reduce phase-noise. A circuit prototype in the hundreds of MHz range, designed in a 130 nm CMOS technology has a very low phase-noise, -132.6 dBc/Hz @ 10 MHz offset, and the power consumption is only 1 mW, which leads to a figure of merit (FOM) of -159.1 dBc/Hz.

Short Bio: Luís B. Oliveira (S’02–M’07) was born in Lisbon, Portugal, in 1979. He graduated in electrical and computer engineering and received the Ph.D. degree from Instituto Superior Técnico (IST), Technical University of Lisbon, in 2002 and 2007, respectively. Since 2001 he has been a member of the Analog and Mixed Signal Circuits Group at INESC-ID. Although his research work has been done mainly at INESC-ID, he has had intense collaboration with TUDelft, in The Netherlands, and University of Alberta, in Canada. In 2007, he joined the teaching staff of the Department of Electrical Engineering of Faculty of Sciences and Technology, Universidade Nova de Lisboa, and is currently a researcher at CTS-UNINOVA. His current research interests are on RF oscillators, mixers, and other building blocks for RF integrated transceivers. He has several publications in international journals and leading conferences and he is author of Analysis and Design of Quadrature Oscillators (Springer, 2008). Prof. Oliveira has served as a reviewer for Journals and Conferences and he is a member of the Technical Program Committee of ISCAS (IEEE).

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