Summary of the thesis

This PhD thesis deals with the design of a CMOS integrated circuit as a readout electronic for the THz bolometric detectors, either semiconductor or high-T_c superconductor. We study a chain of the analog signal processing composed of the differential fixed-gain amplifier for the temperature range of 40 to 400K, as well as of the high dynamic range low-pass active frequency filter. As the optimal amplifier configuration, a feedback-free architecture was selected in order to reach high frequency bandwidth (17MHz for gain 40dB), low quiescent current (Iq=2mA) and high input impedance. In this amplifier, the gain is set in the CMOS structure *via* two different methods and the accuracy is verified by wide-temperature measurements of the fabricated integrated circuit. Consequently, the behavior of the frequency filters is examined namely in the stopband, aiming to increase the maximal cut-off frequency. As an outcome, two structures with low influence of real active elements' parameters are designed: improved type-II Sallen-Key and the structure based on the CCII- current conveyor. In the last part, the integrated CCII- with very low output impedance is presented.

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Invitation to PhD - defence:

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Design of CMOS analog integrated circuits as readout electronics for high-T_C superconductor and semiconductor terahertz bolometric sensors

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