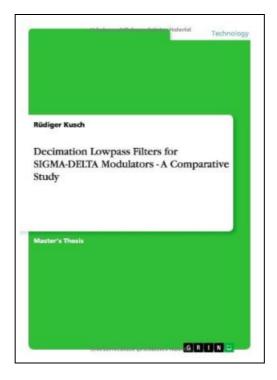
# Decimation Lowpass Filters for SIGMA-Delta Modulators - A Comparative Study



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#### DECIMATION LOWPASS FILTERS FOR SIGMA-DELTA MODULATORS - A COMPARATIVE STUDY



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Grin Verlag. Paperback. Condition: New. 188 pages. Dimensions: 8.3in. x 5.8in. x 0.6in.Masters Thesis from the year 1998 in the subject Electrotechnology, grade: 1, 0 (A), University of Rhode Island (--), 39 entries in the bibliography, language: English, comment: , abstract: The purpose of this thesis is to compare several filter topologies used for the decimation of sigma-delta modulated digital signals. The goal is to present optimized filter architectures with regard to an efficient VLSI implementation. A fifth-order 1-bit sigma-delta modulator using local feedback techniques will be considered as the front-end AD converter. The subsequent digital filter reduces the sampling rate by a factor of 32. The decimation filter must guarantee a narrow transition band between 0. 5 and 0. 55 and stopband attenuation of 100dB. Chapter 1 provides a brief introduction into the principles of digital signal processing. The considerations are focused on FIR filters due to the requirements for acoustic applications. Chapter 2 illustrates the proposed overall structure and the design flow. The objective of chapter 3 is to present the principles of oversampling data converters using sigma-delta techniques. The 5V fifth-order SigmaDelta-modulator with 90dB dynamic range (SNRTHD) will be presented, which has been fabricated in 1. 2um CMOS technology. For the sake of simplicity and robustness, a 1-bit quantizer will be used. Chapter 4 deals with typical hardware realizations of digital filters. Apart from the brute force implementation of the multirate filter with identical filters running in parallel, also the LUT-based approach for small filter orders will be presented. Due to the advantages of compact implementation, the bit-serial approach and the bit-serial multiplier are investigated in detail. In chapter 5 the straightforward one-stage multirate FIR filter will be introduced. To satisfy the specifications, a 4096 tap lowpass FIR filter will be designed. The influence of coefficient quantization...

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